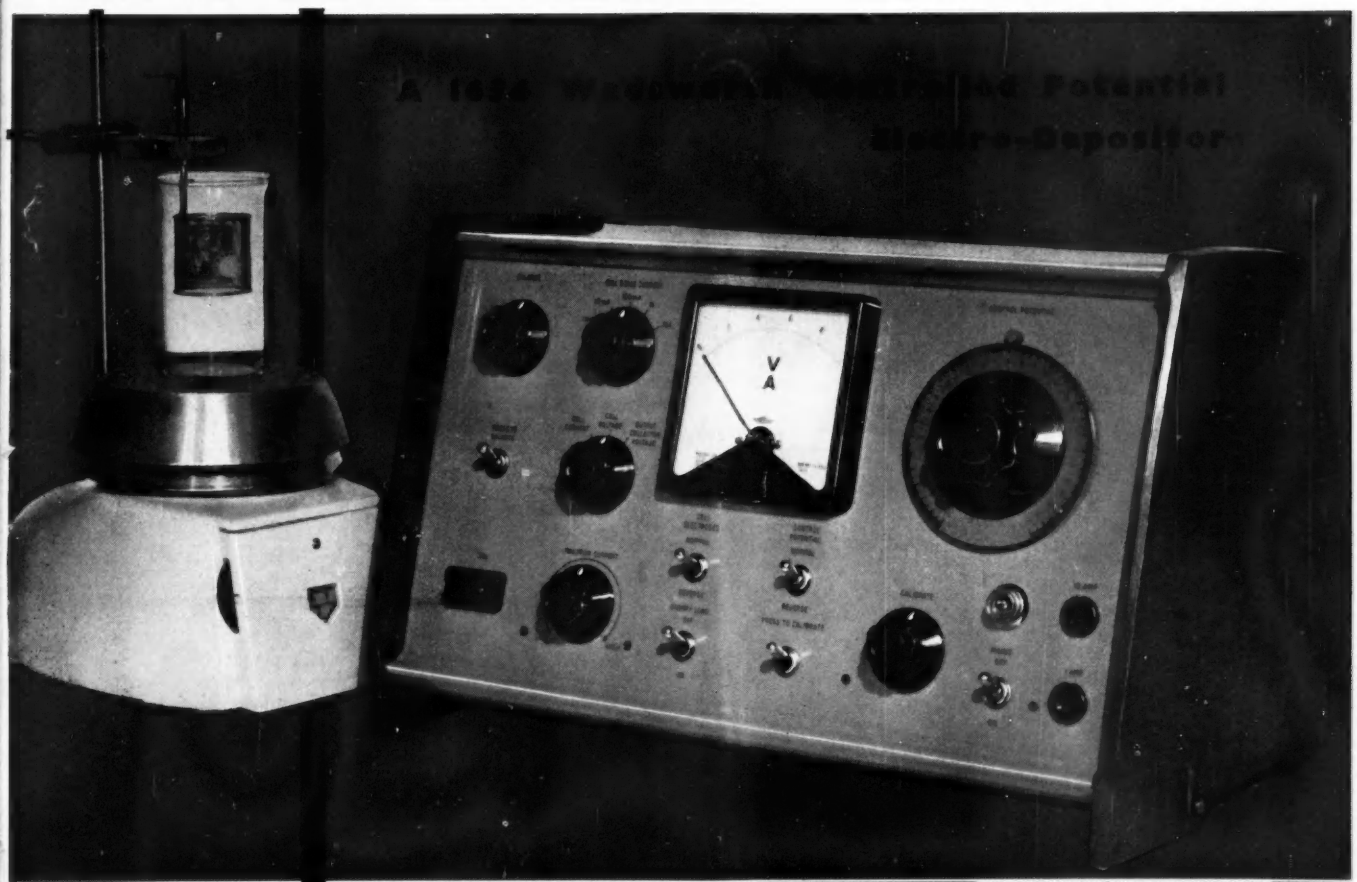
Chemical Age



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(Continued on page 884)

Development chemicals from Heavy Organic Chemicals Division

NUMBER ONE

ICI

Propylene Derivatives

	NAME	DESCRIPTION	QUANTITIES AVAILABLE
1	Propylene dichloride (1:2-Dichloropropane) Liquid. B.Pt. 96.3°C.	Powerful solvents for fats, waxes and a wide range of organic products; these chemicals may be considered as useful start-points for the synthesis of many chemical products.	*Tonnage quantities*
2	Dichlorodiisopropyl ether Liquid. B.Pt. 187°C.		*45 gallon drum lots*
3	Dipropylene glycol Liquid. B.Pt. 232°C.	Intermediate for polyester resins—for the formulation of hydraulic fluids, and for solvent separation of organic compounds; has important humectant properties and may be used to plasticise cork and paper.	*45 gallon drum lots*
4	Mixture of dipropylene glycol and higher propylene glycols (not refined)	Suggested as plasticisers for jointing compounds; may also be used for gas dehydration and de-icing fluids.	*Tonnage quantities*

Phenols and Related Products

5	Cumylphenol (p-(α:α-dimethylbenzyl) phenol) Solid. M.Pt. 72–73°C.	Newly developed intermediate for special oil-soluble 100% phenolic resins and surface coatings of outstanding flexibility, durability and resistance to acids and alkalis. Useful organic chemical intermediate.	*1 lb. samples*
6	Dodecylphenol (a mixture of isomeric p-dodecylphenols) Viscous liquid. 5%-95% boils at 320-335°C. at atmos. press.	An important intermediate for nonionic and anionic surface-active agents. Also for plasticisers, oil additives, resins, rubber chemicals.	*1 lb. samples*
7	2:5 Xylenol 80/90% 2.5.M content. Solid. M.Pt. 60–70°C.	Intermediate for varnish resins, plasticisers, adhesive resins, weedkillers, antiseptics.	*Tonnage quantities*

Butylated Phenols

8	3-Methyl-4:6 ditertiary butylphenol (3M46B) Solid. M.Pt. 56-58°C.	Have wide applications in the rubber and plastics fields as well as other specified uses.	*Technical grade. Tonnage quantities*
9	3-Methyl-6-tertiary butylphenol (3M6B) Solid. M.Pt. 21-22°C.		*Refined grade. Tonnage quantities*
10	4-Methyl-2-tertiary butylphenol (4M2B) Solid. M.Pt. 50-51°C.		

3M6B and 4M2B have antioxidant properties themselves or can be intermediates for antioxidants in the rubber, plastics and petroleum fields. They are useful raw materials for resins, oil additives and rubber chemicals. In addition 3M6B and certain derivatives can be used as disinfectants, and it is also an intermediate for musk ambrette. 3M46B is of particular interest as an intermediate for reclaiming agents for rubber. It may be of interest in resins, plasticisers and surface-active agents.

11	2:4-Ditertiary butylphenol (2:4B) Solid. M.Pt. 53-54°C.	Of interest as an intermediate for surface-active agents and oil additives. Effective as a stabiliser for ethylcellulose.	*1 lb. samples. Enquiries welcome for tonnage quantities*

Organic Acids and Anhydrides

12	Isophthalic acid	Superior alkyd resins may be derived from isophthalic acid; it is important for high quality speciality polyester resins—and is also of interest for plasticisers.	*8 oz. samples. Enquiries welcome for cwt. lots*
13	Trimellitic anhydride	Intermediate for oil-soluble and water-soluble alkyd resins. The trifunctional structure gives high reactivity and it is a useful start-point for the production of unsaturated polyesters, plasticisers, and epoxide resins.	*8 oz. samples*

IMPERIAL CHEMICAL INDUSTRIES LIMITED LONDON S.W.1.

Please send more information on these chemicals:

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ 11 ☐ 12 ☐ 13

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C.A.

H.91

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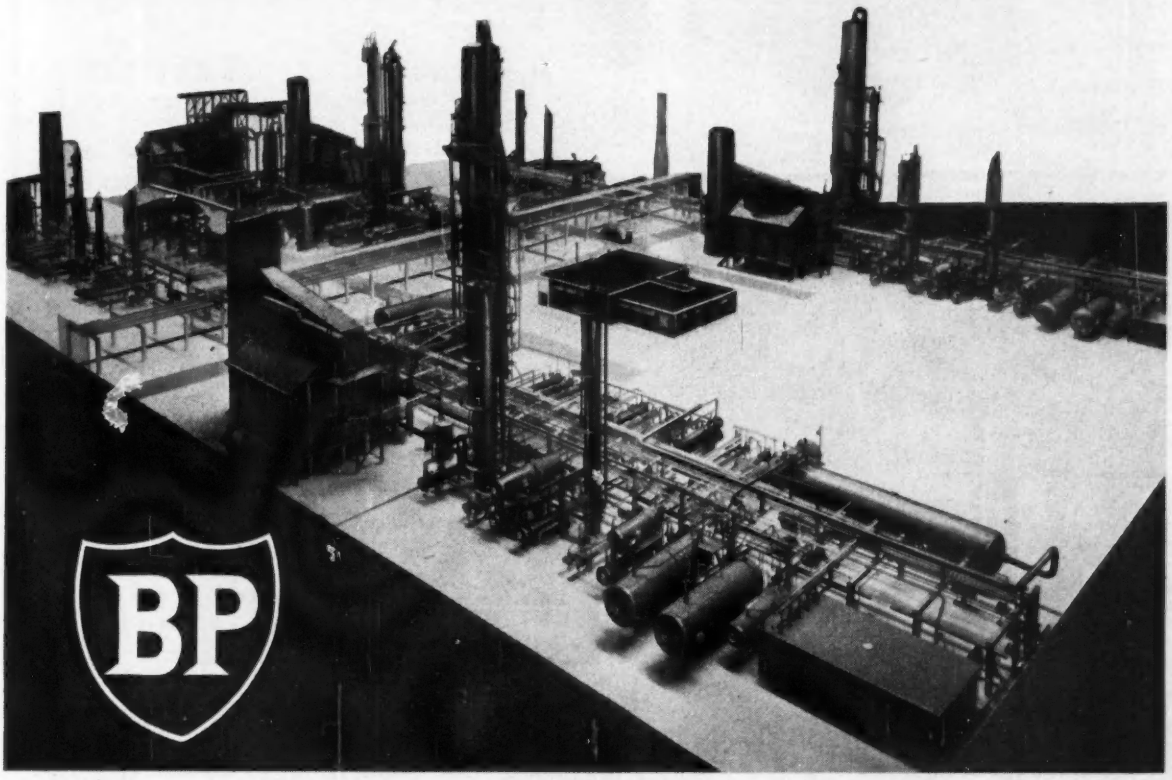
A 3-D DESIGN FOR A 100,000 B.P.S.D. REFINERY



For an increasing number of Kellogg clients in the chemical and petroleum refining industries, scale models are proving a many-sided solution to the economics of engineering and constructing new production facilities. This is especially true in regard to piping—a major investment in any process plant.

Built by Kellogg's designers, these three-dimensional blueprints largely eliminate planning studies and piping key plans, improve designs, facilitate approval, promote faster construction and reduce operating costs. They supplement conventional drawings of overall layout and piping. The models themselves are also used on the job site to save time in explaining construction details to workers and for use in training operators to run the plant. The model shown above is now at Dinslaken, Germany, where it is being used by the BP Benzin und Petroleum A.G. to explain constructional details to their labour forces. In the near future it will be used in the operator-training programme.

Kellogg engineers will welcome the opportunity to explain how the Kellogg 3-D model technique can be of assistance to you in planning and engineering new plant.

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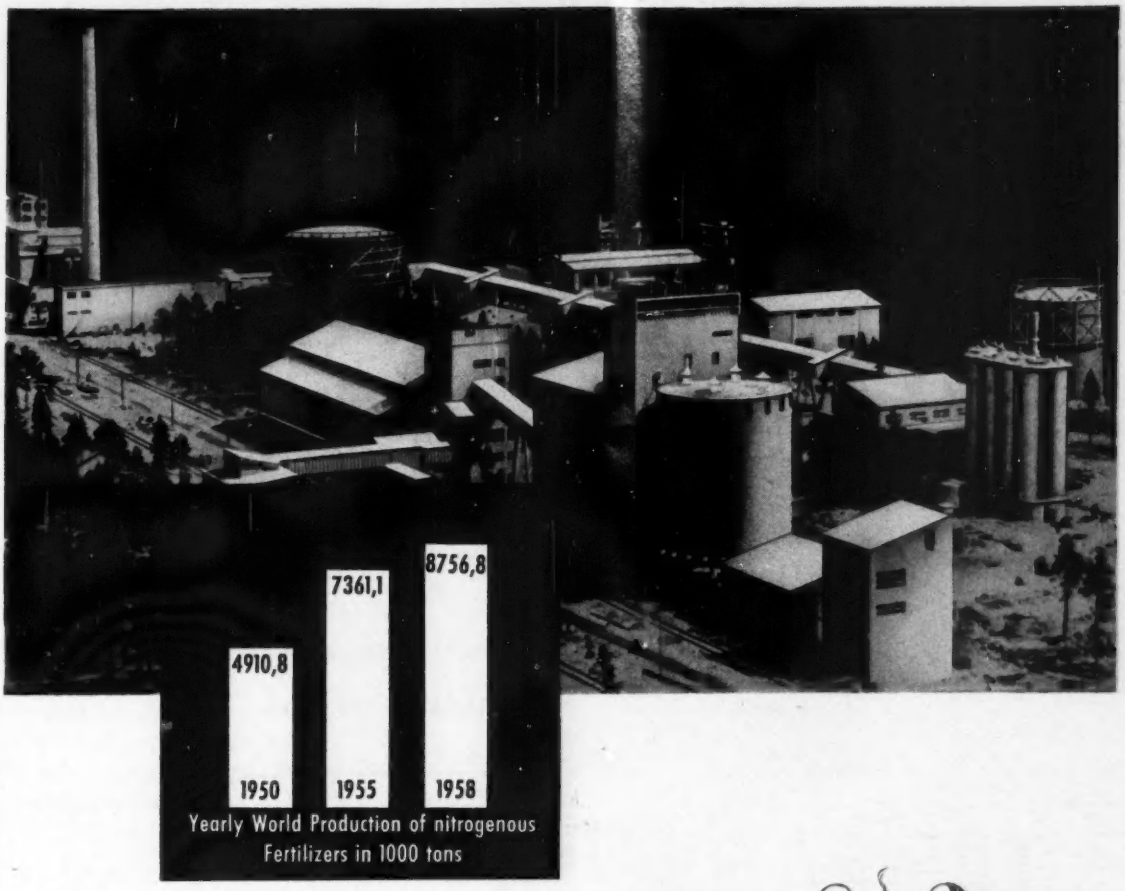

BY THE BY...

qualified chemists and engineers are necessarily individualists. By plotting the correct course and developing teamwork the company management creates the proper prerequisites for successful accomplishments. In this way your contemplated projects are always in good hands at Uhde's.

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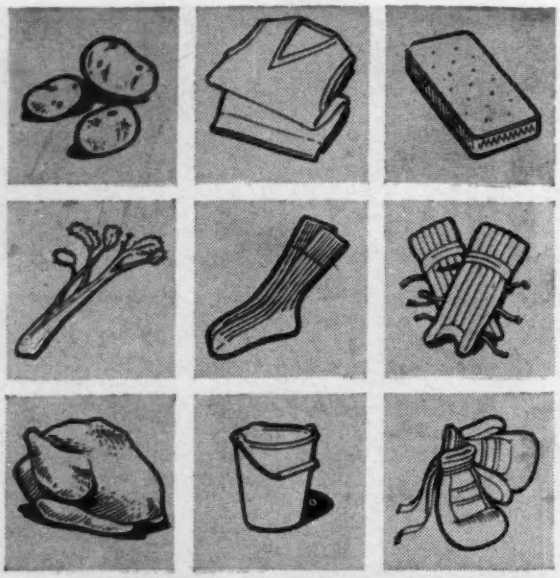
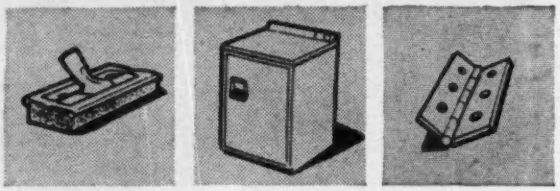
HOECHST-UHDE INTERNATIONAL GMBH FRANKFURT (M) HOECHST Brueningstr. 45 telephone 31 05 01



Pack your product in 'Spescopaks'



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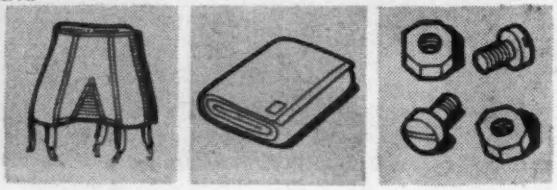

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IN THIS ISSUE

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CHEMICAL AGE

BOUVERIE HOUSE · 154 FLEET STREET · LONDON · EC4

SULPHAMIC ACID FOR U.K.

THE recently announced plans of the Albright and Wilson Group to make sulphamic acid and ammonium sulphamate at the Marchon Whitehaven facilities (CHEMICAL AGE, 5 November, p. 757), will give the U.K. market its first major home supplier. This should stimulate the development of new uses in this country.

Sulphamic acid is a white powder which when pure is non-hygroscopic and non-volatile. It is the strongest solid acid commercially available and because its calcium salt is soluble in water, finds a major application in boiler descaling. Competing with inhibited hydrochloric acid in this application, it is some four times more expensive and is used only where portability is important, such as on board ship and in the more inaccessible parts of the world.

Boiler descaling is the largest U.K. outlet for this product with consumption last year at about 500 tons, accounting for practically all of the available supplies. The picture in the U.S., where total output is about 40 times as high, is quite different with the largest outlet being for the ammonium salt for killing brush and shrubs. Purchased by public authorities such as telephones and railways, as a specification chemical, it is much cheaper than proprietary products. Descaling is the second most important outlet in the U.S.

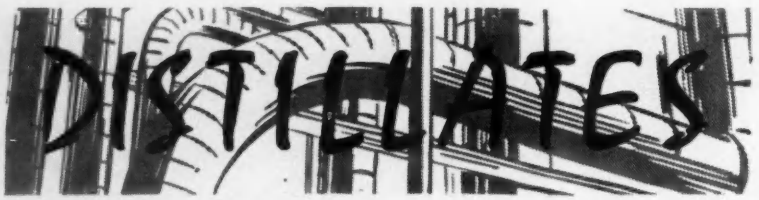
Among the large number of smaller miscellaneous uses, plating and refining of certain metals, softening and flame-proofing of cellulosic fibres are relatively important. These are fully described in the patent literature; Du Pont alone hold more than 100 U.S. application patents.

The German pattern of application is similar to that in the U.K., the biggest outlet for sulphamic acid being its use as a descaling chemical. It is also used to a fairly wide extent for the removal of nitrite in azo dye-operations, and work is in hand to perfect application in detergents.

Until Marchon come on stream in mid-1961 with their plant, which will, it is claimed, meet all known U.K. needs, the market will continue to be served by Hoechst Chemicals with sulphamic acid made in West Germany. Despite the tariff which will be introduced when Marchon are in production, Hoechst Chemicals should be able to maintain their position for a number of reasons. Firstly they have built up this market over the past 10 years; secondly their product is of a known high standard; and thirdly, undoubtedly, U.K. consumption is increasing at a substantial rate and this should continue at least for the time being.

The agricultural use of the ammonium salt is more problematic and the U.S. pattern may not be reproduced. This is because sulphamic acid was first made in the U.S. by Du Pont in the early 1940's and its agricultural applications were established before the specific hormone chemicals, such as 2,4D and 2,4,5T were introduced. Ammonium sulphamate is a latecomer to the U.K. market and probably has not the technical advantages to displace the hormone products. On the other hand it could well cut into the sodium chlorate trade as its use involves no fire hazard.

This is undoubtedly an interesting chemical and some growth would seem a reasonable expectation.



★ In view of the steadily mounting U.S. investment in the British chemical industry, I have followed the current Ford controversy with more than usual interest. The acquisition will cost the Detroit parent something like £130 million. As Sir Miles Thomas, head of the U.K. end of Monsanto Chemical Co., has rightly said in *The Times*, if that money had been spent in the Common Market instead of in Britain, there would have been cause for regrets.

As it is Ford's biggest development programme outside the U.S. is in hand in this country. This is a financial transaction which will bring dollars to Dagenham. Most of the U.S. chemical companies operating in Britain are wholly owned by their parents in the States. In many cases, budgets are tightly controlled from America, together with policy decisions; other subsidiaries have a much freer hand.

In every case that I know of, U.S. investment in Britain's expanding chemical industry has meant business for U.K. plant firms, employment for British labour, increased sales for British chemicals suppliers, plus in the case of many firms—Esso, Monsanto and Dow come immediately to mind, but there are others—both directors and other executives, including senior chemists and chemical engineers, are British.

★ I.C.I.'s rock salt plant extensions (see p. 902) reflect the staggering scale on which local authorities are now using salt to combat the slippery road menace; in fact many of them, by the time winter comes, have stocks of salt placed at strategic points—lying in ambush, so to speak, for the next fall of snow. In this they have been aided by I.C.I.'s development of a unique grade of salt which does not cake and can be stored in the open even in wet weather.

Any suggestion that I.C.I. are investigating the possibilities of bringing on more snow by spraying the clouds with chemicals, or alternatively, that they are following up their latest polythene price reduction (p. 896) by trying to persuade local authorities to erect canopies made of polythene film over their roads should be taken with a very big pinch of rock salt.

★ While salt may be beneficial underneath the tyres of vehicles on icy roads (see foregoing item), it is not at all beneficial on cricket pitches since, according to two Australian workers (J. R. Harris and R. D. Bond of the C.S.I.R.O.) accumulation of salt in the turf is a major reason why cricket pitches wear, lose their grass, and eventually crumble. In the Adelaide area, it was found that in 21 out of 23 turf wickets inspected, the salt content had risen to an undesirably high level, the source of the salt being the municipal water supply. It is calculated that, in Adelaide, normal watering of the pitch adds at least 10 lb. of salt each week, and much of this is retained in the heavy black clays of which wickets are made.

The problem is not confined to Adelaide, or even Australia, but occurs all over the world so, while there is obviously no hope of any sales of salt to cricket club groundsmen, yet (as I might have guessed!) the chemical industry stands to benefit once again, for one of the recommendations in the Harris and Bond report is that bare patches of soil on the wicket should be covered with plastics sheeting to keep them moist and to encourage the growth of grass.

★ Chemical market research in Europe did not exist a few years ago, apart from the efforts of Arthur D. Little and a few companies, notably American. All that has changed and this week two U.S. market researchers left for the States—Mr. Roger Williams by ship and Mr. Robert First by plane both weary men, but satisfied with the greatly increased interest in their subject this side of the Atlantic.

Both are expanding their European interests. I understand that Williams will shortly be announcing a second European office—he already has one in London. As stated two weeks ago in this journal, First has appointed Mr. Albert S. Hester, American Chemical Society's European associate editor, as European operations manager. From 1 December, Hester moves into a new temporary office at 28 Victoria Street, London S.W.1. Before long he will be firmly established with a permanent office in Brussels.

★ Chemical plant executives who have been badgered these past few years on tardy deliveries—and who with the present spate of new chemical projects are likely to be even more harassed in the coming years—can take heart from the woeful experiences of their East European counterparts. After reports of hold-ups on Soviet, Czech and other Communist-bloc projects, news now reaches me that Hungary is also having difficulties in maintaining chemical expansion target dates.

Opening of an alkaloid plant by Chinoin has been delayed due to a hold-up in deliveries of pumps by Ganz-Mavag of Hungary. The Egyesült Gyógyszergyár pharmaceutical works has been able to take up production of Vitamin C as planned because vacuum pumps have not arrived. The chemical plant at Tisza cannot install equipment already delivered by the Soviet Union since the necessary cranes have not arrived from the Csepel steel and machinery combine; the same chemical works is also waiting in vain for ventilation apparatus from Szellözö-Müvek.

Such are the difficulties caused by bad deliveries on the home front. As for imported chemical plant, this is very difficult to reckon with owing to the slowness of planning schedules. With equipment to be imported from other Communist-bloc countries having to be ordered at least one year before they are required, the State Planning Bureau is unable to place orders for more than seven-tenths of the equipment needed.

★ British Railways plans for pipelines alongside their tracks (see my comment, 8 October), may come about sooner than expected. The newly introduced Trunk Pipelines Bill (see p. 896) projects general-purpose lines from Canvey Island through densely populated areas to Denham, Cranford (near London Airport). Published route of this 72-mile network includes laying alongside railways and under canal towpaths.

It is significant that one end of the proposed new line will end on the Grand Union Canal at Denham. Obviously this route can readily be extended up the canal to Birmingham. This scheme has such obvious merits in clearing oil and other tankers off already congested roads that it must surely herald a national pipeline network.

Also in the news are E.N.I.'s plans for an all-Europe oil pipeline network. Recent meeting of E.N.I. negotiators with the Austrian Pipeline-Studiengesellschaft suggest that E.N.I. plan to split the projected Trieste-Bavaria line on the Italian side of the Carnic Alps, with a branch leading to Vienna. Vienna is some 40 miles from Bratislava, terminal of the U.S.S.R.'s 2,500 miles long oil pipeline system. E.N.I. already have an agreement to buy Soviet crude and it is assumed that a direct link between the two systems will be mooted by the Italian State oil company.

★ Sackcloth and ashes! My readers might have been a little puzzled by my reference last week to Monsanto holding two-thirds of Forth Chemicals, while on the facing page, it was stated in bold type that this holding was one-third. I should like to be able to say that my figure was right—but it wasn't. My editorial colleagues erred however in saying that Grangemouth olefin capacity now stood at 130,000 tons a year; 300,000 would be nearer the mark. B.H.C. have capacity for 130,000 tons of ethylene.

Alembic

Project News

I.C.I. STATEMENT SOON ON POLYPROPYLENE PLANT

IMPORTANT news from I.C.I. about their production of the new plastics material polypropylene is expected soon. The I.C.I. product will be known as Propathene.

Quite remarkable progress has been made with the **I.C.I. Plastics Division's** new plant at Wilton. Work on site did not start until May 1959, but it is understood that it will be on stream at any time with capacity of 11,000 tons/year.

First indication that the Wilton plant would be on stream this year was given in CHEMICAL AGE, 2 January, p. 9. This news was followed by a progress report in C.A., 23 January, p. 161. Credit for this major achievement (the polypropylene facilities were not expected on-stream before 1961), is due to I.C.I.'s own design and engineering team and the main contractors, **Constructors John Brown Ltd.**

I.C.I. are licensed to produce polypropylene under Montecatini and Montecatini/Ziegler U.K. patents. They now also hold licences to make the fibre in this country.

I.C.I. have been developing the U.K. market with polypropylene, mostly obtained from abroad, since May 1959. As a result it is clear that the plant will very quickly be operating at a profitable level.

The company has gone in for polypropylene in a big way and as stated in 'Project News' last week, an extension is already under consideration. In fact the new plant was built in such a way as to allow for rapid expansion. There is every reason to think that I.C.I.'s confidence in Propathene will be justified, for it is rapidly becoming apparent that the number of applications will be numerous and varied. Not only can the material be used for many household appliances, but polypropylene film has great prospects and the market for the fibre holds great promise.

Many of the applications for which the polymer has been evaluated were earlier this year described as "entirely novel". This work was backed by the company's research and technical service, much of it in collaboration with customers.

Alongside the Propathene plant, Plastics Division will produce organo-aluminium compounds in bulk for use as catalysts in the synthesis process.

Stripper Tower for B.A. Oil's Aromatics Plant

● THE 150-ft. stripper tower has been hoisted into place in the $2.5 million aromatics plant now being installed by **Foster Wheeler Ltd.**, at British American Oil's Montreal East refinery. When the Udex solvent extraction unit is completed next spring, the stripper tower will separate aromatics from triethylene glycol, which is used as solvent in the process.

A prime product of the new plant will be benzene for B.A.'s cumene operations. At the nearby B.A.-Shawinigan plant, cumene is converted to phenol and acetone. The new plant has been designed so that other aromatics, such as toluene and xylenes, can be produced in the future.

A.E.I. Get Big Rectifier Contract for I.C.I. Chlorine

● A CONTRACT covering germanium rectifiers with a capacity of 32.4 Mw. at 270 v., for the electrolytic production of chlorine, has been placed by I.C.I. General Chemicals Division with the Heavy Plant Division of Associated Electrical Industries Ltd. This is believed to be the largest order for semiconductor rectifiers ever placed by the chemical industry in the United Kingdom. These rectifiers will work in parallel with a large number of motor converters and contact rectifiers (also of A.E.I. manufacture).

A.E.I. Heavy Plant Division's order book in 1960 shows that, in kilowatt capacity, contracts for semiconductor rectifiers now exceed those for mercury-arc rectifiers by more than three to one.

First news of I.C.I.'s major expansion in chlorine and caustic soda at Runcorn and Fleetwood was given in the survey of U.K. chemical plant projects (C.A., 24 September, p. 496), when it was stated that the total increase in chlorine capacity would be 80,000 tons/year.

The new rectifiers are for installation in the chlorine cell room expansion at the Castner Kellner works, Runcorn. Already one of the world's largest electrolytic chlorine manufacturing units, this cell room will, when expanded, it is stated, ensure additional supplies of chlorine for sale and for captive use within the division in producing chlorinated solvents and a variety of other chlorinated organic derivatives, including plastics materials.

Woodall-Duckham Plant for Australian Gas

● FURTHER carbonising and ancillary plant is to be supplied by **Woodall-Duckham (Australasia) Pty.** for the Osborne works of the South Australian Gas Co.

Valued at approximately £A200,000, the order includes the extension of the existing bench by the addition of a further ten 3½-ton intermittent vertical chambers, a second waste heat boiler, extensions to the chamber house with the provision of an electric lift, and a gas washer and gas condenser each of 3 m. cu. ft./day capacity.

£150,000 Mechanical Services Contract from Winfrith Heath

● A CONTRACT worth some £150,000 for mechanical services to Winfrith Heath (Dorset) atomic research establishment has been secured by the Bristol office of **Richard Crittall and Co.** Work is due to begin in January and is likely to take about 18 months to complete.

Laporte Know-how for Joint TiO Venture with American Potash and Chemical

U.S. production of titanium oxide is the subject of a new joint venture by Laporte Industries Ltd. and American Potash and Chemical Corporation, Los Angeles. Laporte will supply technical information and plant design, on the basis of which American Potash will construct the plant and operate the new business.

Plant site will be in California and will give the West Coast area its first titanium oxide facilities. Share capital in a joint company will be held 15% by Laporte and 85% by American Potash.

The agreement affecting this co-operative venture was signed in London on Monday. The new joint company has yet to be named.

Initial capacity will be 25,000 tons/year and capital investment is estimated at $15 million. Design will include provision for future expansion. The new plant is expected on stream in the latter part of 1962, but prior field tests will be made using pigment provided by Laporte Titanium Ltd.

Laporte, one of the U.K.'s two major titanium oxide producers, also have large stakes in hydrogen peroxide, sulphuric acid, activated earths, aluminium salts and fluorine compounds. American Potash produce a wide range of chemicals at Trona and Los Angeles in California; Henderson, Neveda; and a number of Eastern States.

Explosion at I.C.I.'s Hillhouse Carbide Plant

A temporary stoppage has been caused following an explosion in the carbide crushing plant of I.C.I.'s General Chemicals Division at Hillhouse, near Fleetwood on Monday. Cause of the explosion is not yet known. The explosion ripped open the asbestos walls of the building. Workmen on the plant escaped serious injury, but one was taken to hospital.

In Parliament

Canvey-London Pipeline Bill May Herald National Network

PIPELINES are in the news in Parliament again with, on Thursday this week, further opposition to the Esso Petroleum Co. Bill and the new Trunk Pipelines Bill presented on Monday for a general purpose pipeline system from Canvey Island to London and beyond.

The Esso project involves oil lines from Fawley to London Airport and ethylene lines from Fawley to I.C.I.'s ethylene oxide facilities on Severnside. These projects are seen as of national importance by the Government. The Bill has already been opposed in the Commons (C.A., 23 July, p. 134).

The new Bill is promoted by Trunk Pipelines Ltd., Bishopsgate, London E.C., and the scheme has been prepared by Edward Sandeman, Kennard and Partners, Victoria Street, London S.W.1. The scheme differs from the Esso proposals in that most of the proposed route is in built-up areas where easements have already been granted. Thus, the line would run from the Haven Wharf on Canvey Island along the railway line from Hornchurch to Dagenham Dock station, across Barking Creek and along the northern outfall sewer; through West Ham and on to the Hertford Union Canal at Poplar. This line would be followed into the Regent Canal, thence the Grand Union Canal (Paddington branch) and then along the railway line to Denham.

One branch is from Dagenham to Purfleet, another through Southall along a branch of the Union Canal to a terminal point at Cranford, near London Airport. A third branch would start near Wormwood Scrubs along the railway to Fulham to the Thames at Broomhouse Dock, past Putney Bridge to an oil depot at Crabtree Wharf. A short branch line runs under the Thames from Fulham to the south side of the river and one to an oil depot in Wandsworth.

Our lobby correspondent believes that the Denham terminal point could later prove the starting point of a further pipeline along the Grand Union Canal to Birmingham, which it is understood would be introduced if the present Bill is approved.

Trade Effluents Discharge, Subject of Two New Bills

TWO Bills dealing with the discharge of trade effluents are being introduced in Parliament this session, writes the CHEMICAL AGE lobby correspondent.

The first is a Government measure, the Public Health Bill, which has been introduced in the Lords. Part V of this Bill amends the law relating to the discharge of trade effluents into public sewers. It enables local authorities to make charges, and impose certain conditions, in respect of certain trade effluents which are not controlled under the Public Health (Drainage of Trade Premises) Act, 1937. There is in each case a right of appeal to the Minister.

Part V also provides that farm effluents and effluents from premises used for scientific research or experiment shall be regarded as trade effluents subject to the provisions of the Act of 1937, and that the Minister may by order classify other effluents as trade effluents.

The second Bill will be introduced by a private member, It is understood Mr. J. M. Temple (Cons., City of Chester), who was successful in the Commons' Ballot for Private Members' Bills, intends to introduce a measure to amend the Rivers (Prevention of Pollution) Act, 1951, so as to give river boards in England and Wales further control over the discharge of sewage and trade effluent into rivers.

The Act gave river boards powers in respect of new and altered channels of discharge, but excluded all existing discharges from their control. The new Bill would oblige all dischargers to apply to the appropriate river board within a prescribed period for permission to continue their practice.

Gas Liquor as Fertiliser

Fertiliser subsidy claims received from farmers in Staffordshire show that they bought about 3.8 million gallons of gas liquor in the year ending 30 June 1959. The provisional figure for the year ending 30 June 1960 is 4.65 million gallons. This was stated by Mr. J. B. Godber, Parliamentary Secretary to the Minister of Agriculture, Fisheries and Food.

Bromborough Acid Emissions

Measures taken earlier this year to reduce the emission of dust containing sulphuric acid at Bromborough power station had not been entirely successful, said Miss Edith Pitt, Parliamentary Secretary, Minister of Health, on Monday. The local authority is studying the effects of the emission on health.

Free Holidays to Promote Antibiotic Sales

Mr. Enoch Powell, Health Minister, agreed on Monday to do everything he could to persuade pharmaceutical companies not to promote the sale of antibiotics by offering continental holidays as prizes to pharmacists. Aspro-Nicholas were named as having done this when introducing a new antibiotic. Mr. Powell said he had been told that this type of promotion would not be used in the future.

I.C.I. Cut Polythene Price to Boost Sales

THE U.K. price of Alkathene, I.C.I.'s brand of polythene, was reduced by 4d/lb. to 1s 10d/lb. on 21 November—the fourth reduction in price since September 1958, making an overall reduction of 33% in two years. This latest reduction is expected to encourage further rapid expansion in polythene applications, particularly for packaging, film and bottle manufacture.

I.C.I.'s capacity for polythene production in the U.K. is over 100,000 tons/year. This latest price reduction is in line with the company's policy of stimulating the growth of polythene usage as bigger plants come on stream and lower costs are achieved. It also anticipates, perhaps, the increased competition that is likely to result from continuing expansion in polythene manufacturing capacity—combined capacity of Union Carbide, Monsanto, Shell and British Hydrocarbon Chemicals should be about 70,000 tons by the end of 1961—while the pace of sales is slowing. Exports, too, are hampered by the present world over-capacity and it seems inevitable that prices should come down.

Rumanian Calcium Carbide for the U.K.

UNDER a new three-year trade agreement, quotas for the first period ending 30 September next, include calcium carbide (£300,000) and other chemicals and pharmaceuticals (£110,000).

U.K. goods for export to Rumania during the same period include: chemicals including, but not limited to, phenol, pharmaceutical chemicals and goods (including dressing), dyestuffs, paints and inorganic pigments, enamel colours, liquid gold, liquid platinum and lustres, thermal insulating material, gelatine, glue and size, plastics materials (including sheet and transparent cellulose film), catalysts and anti-knock compounds (£400,000); plant and machinery (£2 million); and scientific instruments, etc. (£100,000).

The agreement is in addition to trade in goods which can, under U.K. import licensing regulations, be imported from Rumania and other countries without specific import licences.

A.B.C.M.'s 1961 Dinner

Next annual dinner of the Association of British Chemical Manufacturers will be held on Wednesday, 11 October 1961, at 7 p.m. for 7.30 p.m. in the Grosvenor House, London W.1. It will be held the evening before the annual meeting.

Duke of Edinburgh Visits Dowpon Herbicide Factory at King's Lynn

DETAILS have been released of the £1 m. Dowpon plant of Dow Agrochemicals Ltd., at King's Lynn, Norfolk, which was completed earlier this year (C.A., 9 July, p. 55) and which was the subject of a private visit by the Duke of Edinburgh on 18 November.

Dowpon is a systemic grass herbicide, and is a preparation of dalapon, the sodium salt of 2, 2-dichloropropionic acid ($CH_3.CCl_2.COOH$). the final product being a spray-dried powder containing a wetting and penetrating agent. The plant has been designed so as to retain all the essential features of the manufacturing plant of the parent company, the Dow Chemical Co. at Midland, Michigan, U.S.A., but in such a way as to meet local conditions and conventional British practice.

All equipment was manufactured in this country except for four special valves which were imported from the U.S., and the spray drier which was manufactured in Denmark but is fitted with British made instruments and furnace equipment. The plant incorporates a raw water storage tank, a water cooling tower of red cedar external construction with polystyrene grid-packing, and a fully automatic boiler fed from a lime soda water softening plant.

Bulk Handling

All raw materials except the wetting agent are handled in bulk, and together with recovered hydrochloric acid are stored in bulk in the tank farm. Chlorine and caustic soda are delivered by rail. Chlorine is vaporised and is automatically controlled to provide constant pressure in the line to the offtake point. The chlorine handling unit is designed to apply not only to the existing Dowpon plant but to any other plants on the site, as, indeed, are many other of the utilities. (As mentioned in CHEMICAL AGE, 12 November, p. 813, a plant to produce Zoamix coccidiostat is being built alongside the Dowpon plant.)

The "wet end" of the process (which produces the sodium dichloropropionic acid solution ready for the drier) involves highly corrosive conditions and this has led to the use of a very wide range of constructional materials, including aluminium and stainless steel for handling the propionic acid; also special alloys, lead, glass-lined equipment, glass, graphite and polythene. The process consists essentially of the introduction of two atoms of chlorine into one molecule of propionic acid in the presence of a catalyst, simultaneously producing two molecules of hydrochloric acid. The distilled dalapon acid is thereafter continuously neutralised with caustic soda and fed with a proportion of a wetting agent to the spray drier from which it is bagged off ready for use. The hydrochloric acid is recovered in a falling film carbon absorber automatically controlled to produce acid of constant strength. The vent gases are finally scrubbed in a tile-lined tower packed with Dowpack (a special type of high surface polystyrene packing) through which caustic soda is circulated.

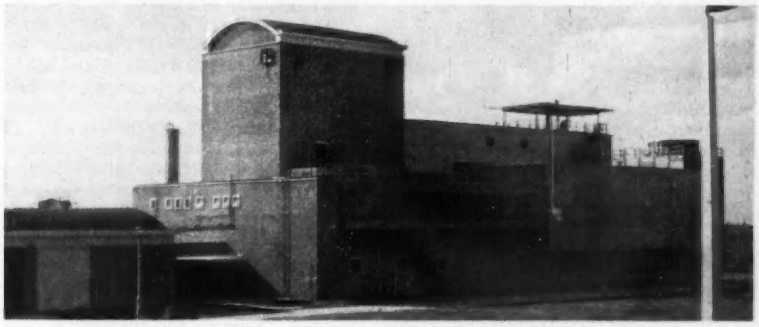
A great deal of engineering work has been carried out to avoid any aerial pollution or liquid effluent. Thus there are two separate vent systems, one for HCl, and the other for general plant gases effluent. There are independent treatment plants for both systems.

The plant also includes a great number of safety devices, showers, eyewashers, and an automatic sprinkler system, and there is an analytical production laboratory which deals with all production aspects from the raw materials to the final products.

The bagging-off point from the spray drier is in direct connection to the warehouse. The latter is of unusual design, having a roof of barrel vault style, lightweight, and made by first erecting a prefabricated section of tubular steelwork, covering this with expanded metal, and then with a lightweight concrete made with expanded vermiculite as a filler.

Factory and administrative building are situated in a site of 83 acres on the bank of the Great Ouse River, and connected by rail to the Bentinck Dock at North Lynn.

During his tour of the plant and buildings, the Duke of Edinburgh was accompanied by Dr. W. E. Ripper, managing director, and Sir Norman Hulbert, D.L., M.P., director; Mr. C. B. Branch, president of Dow International S.A. and director of Dow Agrochemicals Ltd.; Mr. J. W. Britton, manager, Dow Agrochemicals Company's agricultural chemical division and director, Dow Agrochemicals; Mr. C. Robertson, director, Dow Agrochemicals Ltd. and manager, Nederlandsche Dow Maatschappij; and Dr. E. Kenneth Woodford, director of the Agricultural Research Council's weed control organisation.



Dow Agrochemicals' Dowpon factory at King's Lynn, with (left) the first section of the warehouse. Main contractors were Constructors John Brown Ltd.

New Research Association Will Study Health Effects of Chemicals in Food

CREATION of a central research station to investigate the biological effects of the many substances used in food manufacture is the aim of the newly formed British Industrial Biological Research Association, which has already received firm undertakings of support from 90 individual companies, who guarantee a total sum of some £23,000 a year for the first five years. These companies include leading members of the chemical industry (such well known names as I.C.I. and Shell figure among them) as well as of the food, essences, plastics, packaging and cosmetics industries. In addition, the D.S.I.R. has agreed to match the industrial subscription £1 for £1 up to a total grant of £47,000/year.

The Association hopes to build its laboratories at Leatherhead, at an estimated capital cost of £56,000. It will use land leased from the British Food Manufacturing Industries Research Association, which has offered to share some facilities in the initial stages. If negotiations go as expected, most of the buildings should be completed by the end of 1961 and the research station should be fully operative by mid-1962.

The Association will study the possible effects on health and ensure the harmlessness of substances which may be ingested in food, drink and cosmetics. The research station will investigate substances used either as processing aids in food manufacture or for flavouring and colouring food, as well as those which may get into food from pesticides, food machinery, packaging materials or utensils.

Temporary headquarters of the Association are at 11 Green Street, London W.1.

Shell's Joint Process for Isoprene and Butadiene Cuts Costs, Raises Yields

FOR many years the chemical industry has sought methods of producing isoprene, the basic monomer of natural rubber, commercially. The attractive direct dehydrogenation method has up to now proved uneconomical due to the difficulty of separating the impurities produced by dehydrogenation. The only process which has so far shown any sign of commercial success is the two-stage route involving the reaction of isobuylene with formaldehyde and subsequent dehydration, a process used in Germany during the second world war.

Now, however, the direct dehydrogenation process has come to the fore with the appearance of a new patent which has recently become available in Australia. Direct dehydrogenation of isoprene resembles the process for butadiene. Both processes involve the catalytic dehydrogenation of a mono-olefin (isoamylene or butylene) to give a di-olefin (isoprene or butadiene). The new patent describes a process, assigned to Shell International Research Maatschappij, which takes place in four stages: firstly the catalytic dehydrogenation of the olefins butylene and amylene producing the diolefins butadiene and isoprene together with some light gases and a small amount of heavier polymeric material; secondly the passage of the mixture through distillation steps which separate the light gases and polymeric material from butadiene and isoprene; thirdly the separation of butadiene and isoprene by distillation; and lastly the separate purification of butadiene and isoprene by further distillation.

Parallel Dehydrogenation

All these steps are conventional ones and separately have been used for the commercial production of butadiene and are known to apply to isoprene. However, the separation of the isoprene from the dehydrogenation products has been too expensive to operate commercially, but it now appears that Shell intend to process butadiene and isoprene together.

The advantages of this joint process would lie in reduction of capital outlay and labour costs, as well as also in the better yield of both butadiene and isoprene which results from common dehydrogenation.

The combined process is described in *Chemical Week*, 29 October. The precursor of butylene, butane, is converted to butylene over a catalyst of active alumina impregnated with chromium oxide. The unreacted butanes are removed by a two-stage extractive distillation process with aqueous acetonitrile. The butylene is then separated from any butadiene by liquid-liquid extraction with aqueous cuprous ammonium acetate. The butadiene goes off as product and the purified butylene is mixed with amylene feed.

The combined stream is vaporised and then fed into the catalytic dehydrogenation unit, consisting of a bank of reactors operating in parallel, each containing a fixed bed of iron oxide catalyst promoted with chromium oxide and potassium carbonate. The operating temperature is 1,100°F, reactor inlet pressure about 10 p.s.i. and outlet pressure 4 p.s.i.g. Convertion of butylenes into butadiene is about 25% and amylene to isoprene about 35.5%.

The next stage is the parallel purification of butadiene and isoprene. The gases, leaving the reactor at about 460°F, are fed directly into a stripper-scrubber operated at atmospheric pressure, where a down-flowing stream of recycled oil cools them and absorbs the polymeric materials. The gases then pass through a cooler which condenses water vapour, a separator which allows the condensed water to be drawn off, a compressor which compresses them to 105 p.s.i.g. and an ammonia chiller which condenses all but the light gases. A second separator separates the light gases from the now liquid product mixture and unreacted feed. The liquid is pumped through heat exchangers and carbon monoxide and propane is removed leaving a mixture of butylene, butadiene, isoamylene and isoprene.

The last step in the parallel purification stage is a fractionation in which the butylene-butadiene mixture is separated from the isoamylene-isoprene mixture. The butylene-butadiene mixture is recycled back to the liquid-liquid extractor where the butadiene is separated out as a product and the butylene sent forward again into the catalytic dehydrogenator.

Meanwhile the isoprene-isoamylene mixture passes first to an extractive distillation with aqueous acetonitrile which removes isoamylene for recycling and then to a distillation column where piperylene is separated from the isoprene product.

This process is described in Shell's Australian Patent (57725/-60). Shell are currently starting up or constructing three isoprene plants based on a new process although it is not known whether it is the one described in the patent.

High-purity Isoamylenes from New Sinclair Petrochemicals Process

A NEW extraction process for obtaining high-purity isoamylenes, the isoprene intermediate, has been developed by the U.S. company, Sinclair Petrochemicals. It differs from the conventional process in that it enables the sulphuric acid used in the extraction to be recycled without being reprocessed.

Isoamylenes (2-methyl-1-butene and 2-methyl-2-butene) are obtained from the C_5 petroleum fraction in which they are present in a concentration varying from 25 to 45%. After catalytic cracking, the C_5 fraction, obtained by distillation, is solvent extracted with 65% sulphuric acid in a contactor. The isoamylenes are selectively absorbed in the acid stream, which is then treated with hexane, heptane or some other aliphatic hydrocarbon. The isoamylenes separate into the solvent and the 65% sulphuric acid can be recycled for re-use immediately. In the conventional routes the isoamylenes are separated by diluting the sulphuric acid with water until the concentration is lowered to about 48% when the organic and acid phases separate. The sulphuric acid must then be reprocessed to 65% concentration before further use.

Once the isoamylenes are in the solvent they can be obtained by distillation in a purity greater than 97%.

With this process, for which a patent has been applied, Sinclair hope to capture some of the growing isoprene market, by building an isoamylene plant with an output for outside sale and by licensing the new process through Stratford Engineering Corp.

The potential for isoprene is vast. Present industry demands call for 230,000 long tons of stereoregulated rubber capacity to be on stream by the end of 1962.

Besides the Sinclair isoamylene process the other routes to isoprene are: from isobutylene and formaldehyde; dimerisation of propylene to isohexene which is then cracked to make isoprene; dehydrogenation of isopentane; and several other processes.

Although isoprene is at present the only apparent large outlet for isoamylenes, they do, like other tertiary olefins, add and condense to make such products as mercaptans, alcohols, ethers, amides and chlorides. Moreover, through chlorination, isoamylenes can be used to make substituted phenols and naphthalenes.

Hungary Seeks U.K. Caprolactam Plant

The Hungarian Legation, 46 Eaton Place, London S.W..L., acting for Komplex, Budapest V, Dorottya-utca 6, would like to hear from U.K. companies who could supply a complete plant for the production of 5,000 tons a year of caprolactam in 7,800 working hours.

Parliamentary Committee

Address of the Parliamentary and Scientific Committee has been changed to 7 Buckingham Gate, London S.W.1. Telephone numbers remain Victoria 2608 and 1645.

Chemicals for Grassland

Dutch Nitrogen Use May Be World's Largest

WHAT is probably the highest rate of nitrogen use on farm grassland anywhere in the world, was described by H. van der Molen's paper read to the Fertiliser Society in London this week (24 November). That Dutch farmers as a whole are big users of fertilisers is well known. Their average use per grassland acre averages about 86 lb. as nitrogen, equivalent to about 4 cwt. an acre of Nitro-Chalk or ammonium sulphate. British grass on average receives no more than a quarter or an eighth of this, according to type of grass.

But Dr. van der Molen was not concerned with the average use of nitrogen in his country. He discussed far higher use—on some 12 to 15 experimental farms, annually being given 180 or more lb. of nitrogen per acre, i.e., equivalent to 8 or more cwts. an acre of Nitro-Chalk. On some of the farms these high annual rates have now been given for 10 successive years. The farms range in grassland size from about 15 to 65 acres. Most of the grassland, as in Holland itself, is permanent rather than rotation grass.

As Nitro-Chalk

These high rates of nitrogen fertiliser are given in about six dressings a year, almost always as the Dutch equivalent of Nitro-Chalk, Nitrolime (a granulated mixture of ammonium nitrate and calcium carbonate). The first dressing is as early as possible each spring and the others follow steadily after each 'cut' of grass, whether by mowing or by grazing. As much grazing fodder and hay and/or silage as possible is used, reducing the additional need for concentrates to a minimum.

It is often argued that even the normal rates of Dutch nitrogen used on grass may have dangers if given regularly elsewhere—long-term effects on swards, on fertility, on mineral composition of grass herbage, on animal health. This paper's evidence about the long-term effects of far higher nitrogen use is invaluable.

The botanical quality of these intensively nitrogen-fed swards steadily improved except for almost total loss of clovers. The proportion of the better species of grasses rose from an average of 50% in good Dutch pastures to 60% in the experimental farm swards. This gain was at the expense of poorer grasses and weeds. Loss of clovers is not serious in Dutch farming as farmers attach more importance to high grass output than to the use of clovers as nitrogen-fixing components of mixed swards. Although the nitrogen fixed by clovers is 'free', total output from a clover-grass sward cannot be as high as output from a fertiliser-fed grass sward; also, clover is a late grower in the grazing season and clover-containing swards are more uneven in their output. Clover makes little or no contribution to the first cut each season.

The standard of animal health on the high-nitrogen farms had not been lower than the national standard for dairy cows. Milk production per cow had been almost always higher than that for cows on other farms in the areas of the experimental farms. Some figures given by Dr. van der Molen were as follows:

	Milk production per cow			Lb. of nitrogen per acre
	1951	1955	1958	(1958)
Exp. farm 1...	4358	4443	4319	235
Other similar farms ...	4140	4040	4080	65
Exp. farm 2...	4835	4674	4308	287
Other similar farms ...	3680	3980	3940	92

Animal fertility was another measure of animal health. The index of fertility is the number of artificial inseminations needed per pregnancy. This index for cows on experimental farms was slightly lower than the index for other farm cows using the same A.I. centres. Data given in the paper proved this conclusively. The superiority could be due again to better quality stock, but it could not have been maintained over the years of high nitrogen use if animal health had been adversely affected.

Animal Health Risk

The greatest risk to animal health from high use of nitrogen is regarded as that of hypomagnesæmia or grass tetany. Only on one of the experimental farms had there been more than isolated cases of this; even on the farm where troublesome outbreaks had occurred, this had been remedied and there had been no outbreaks in 1957, 1958 and 1959. In 1959 there were no cases of hypomagnesæmia on all 15 of the high-nitrogen farms. Possibly one factor in this low incidence of a frequently occurring disease had been the use on some of the farms of a magnesium-containing Nitrolime, in which dolomite replaced the calcium carbonate. This had led to small increases in the magnesium content of the grass herbage. Supplementary feeding in the spring—often practised to reduce the risk of hypomagnesæmia—had been reduced by half on these farms in recent years.

The extremely high use of nitrogen planned for these special farms was originally expected to lead to high needs for other fertilisers, particularly for phosphate and potash. As the experiment proceeded, however, this extra requirement for other fertilisers was not found necessary. With increased grass output, the number of cows per acre was raised; this in turn had raised the solid and liquid manure supply for return to the soil, with the result that most of the extra phosphate and potash removed from the soil with extra grass growth was also being steadily returned.

High soil contents of phosphate and potash had been built up and in later years the annual supplies of phosphate and potash fertilisers were reduced, despite the fact that on most of the farms yearly amounts of nitrogen were being considerably increased, e.g. on one farm 1958 use was 287 lb. of N per acre against 208 lb. in 1951.

Potash Application

In 1958 out of 11 experimental farms it was not regarded necessary to apply any potash on five. The rates given to three others were low, and on the three where high rates of potash were given the experimental work had not started until 1955 or later and potash reserves had not yet been fully built up. Moderate rates of phosphate were being given annually to all the farms, however, but these rates in the late 1950s were about one-half to one-fifth of the rates initially given in 1951. It had been clearly shown that very high nitrogen use for grazed grass does not need to be continuously associated with high use of phosphate and potash; once a good basic reserve of these other nutrients had been created it could be maintained by animal returns and by moderate fertiliser supplementation.

It is often argued that responses to fertilisers fall when high rates are given year after year; this was at one time thought to be occurring on the Dutch experimental farms. It was then found that with very high nitrogen rates, output tended to be greatest in dry years, lower in wet years; this is a weather effect in inverse to the effect where medium rates of nitrogen are used. As 1954, 1956 and 1957 were three abnormally wet years, there seemed at that time to be a falling-off in responses to nitrogen on the experimental farms. It was now realised to be due to weather variations.

As to whether high nitrogen use pays on dairy farms, figures were given in the paper showing for the six experimental farms of longest history higher net profits per acre than the averages for similar farms. The costs on the experimental farms had been higher through the intensive use of nitrogen but production had increased at a higher rate than costs. Total cost of all feed for the cows is about the same on the experimental farms as on other Dutch farms but milk yields are higher. The capacity of the experimental farms to stock more cows per acre enabled one man to look after more cows; this was shown to lead to a corresponding saving in labour cost, another contribution to better financial results.

This evidence from Dutch research provides powerful argument for very much higher fertiliser use on grassland in Britain.

£1,000/year Saved by N.I.F.E.S. on Graesser Fuel Bill

AMONGST chemical companies for whom the National Industrial Fuel Efficiency Service have been carrying out investigations are the B.B. Chemical Co. Ltd., Leicester, whose works has been subject to increasing process and space heating demands. In this case, a steam accumulator has proved very effective, while careful attention to operation and maintenance has ensured that the boiler plant has continued to give the very best service. In the drum reclaiming department, the fitting of a hydraulic device for drum and barrel cleaning, operating from the standard steam supply, is saving approximately £450 a year, the cost of the equipment having been recovered within six months.

With present boiler capacity now approaching its limits N.I.F.E.S., whose service to the company is now in its fifth year, has been asked to investigate the estimated future steam demand in the light of possible developments and to give recommendations on the action to be taken to meet requirements.

At the works of R. Graesser Ltd., Sandycroft, a test showed that the three oil-fired Economic boilers were operating at efficiencies of 75%, 80.5% and 84.1%, the variations being caused by load factors and differing states of cleanliness in each boiler. A 3% increase in overall efficiency was found to be possible and the installation of soot blowers was, therefore, recommended. The saving should amount to £2,600/year, less £1,500 for depreciation and maintenance of the soot blowing equipment, giving a net saving of over £1,000/year.

Some further examples of chemical industry fuel savings reported by N.I.F.E.S. were given in CHEMICAL AGE, 22 October, p. 668.

Australian Tariff Board to Study Duty on Chlorine Products

THE Australian Tariff Board is to enquire into whether assistance should be accorded to the production of chlorine products. The reference to the board is mainly of departmental origin, but representations have been made by local manufacturers of chloropicrin.

Products covered by the enquiry include insecticides and disinfectants; ammonium chloride; volatoids of salammoniac; bleaching powder and chlorine; carbon tetrachloride; drugs and chemicals including pentachlorophenol; perchlorethylene; trichlorethylene; dichlorodiphenyltrichlorethane; hexachlorobenzene; chloropicrin; hyposulphite and hypochlorite of soda; carbonate of magnesia; potassium chlorate; calcium citrate; monochloracetic acid; certain pharmaceutical preparations, etc.

U.K. firms wishing to tender evidence should notify the Australian authorities not later than 1 December 1960 and before then should notify their intention to the Commercial Relations and Exports Department, Board of Trade, Horse Guards Avenue, London S.W.1, quoting reference C.R.E. 12471/60.

Triple Point of Water Accepted as Thermodynamic Point

The triple point of water, 0.01°C (273.16°K) has been accepted as the new thermodynamic point for temperature measurement by the 11th General Conference of Weights and Measures held in Paris recently. The conference also authorised a study to define the litre. At present the litre is defined as 1.000028 cu. decimetres.

Wm. Blythe Chairman's 75 Years' Service

G. K. Hampshire, I.C.I. director, presents a silver coffee set to William Collison, chairman of William Blythe and Co. Ltd., Holland Bank Works, Church, Accrington, at a luncheon held to celebrate his 75 years' service with the company (see 'People' last week)

Review of Benzole Technology 1959

TECHNICAL literature on benzole and allied products published during 1959 is covered in 'Review of benzole technology, 1959,' published by the National Benzole and Allied Products Association, 132-135 Sloane Street, London S.W.1. Prepared by the technical staff of the Watford laboratories of Benzole Producers Ltd., this 150-page publication covers 1,272 references, for the most part very briefly noted.

There are eleven main sections, dealing with: sources of benzole, recovery of benzole from gas, processes for interconversion of aromatic hydrocarbons, benzole refining, composition of crude and refined products, benzole properties, analytical methods, uses of benzole, safety and handling, specifications, economics and statistics.

Copies of the booklet, price £1 2s 6d per copy, are available from the Association at the above address.

Whessoe Establish Nigerian Company

FORMATION of a Nigerian associated company, Whessoe Engineering Ltd., is announced by Whessoe Ltd. The Nigerian company, with headquarters in Port Harcourt and registered office in Lagos, provides erection and manufacturing services for Whessoe products including storage tanks and associated plant. The company also undertakes general engineering contracts throughout West Africa from the base and shop facilities being set up in Port Harcourt.

Since 1950 Whessoe have built 106 tanks in the area to store 51,000,000 gallons of petroleum products in addition to vegetable oils storage and allied equipment.

£38,000 Order for Q.V.F. Glass Pipeline

CONTRACT has been awarded to Q.V.F. Ltd., chemical engineers in glass, Stoke-on-Trent, for a waste-line installation to the value of £38,000 in the organic chemistry block of Liverpool University.

Glass waste-lines are to be installed in all the laboratories, an area of 50,000 sq. ft., making this the biggest waste-line installation in the U.K. It will involve 60 vertical drain-line stacks, mainly in 3-in. and 4-in. bore piping. The 4-in. pipelines will serve a dual purpose in that they will also carry rain water from the roof—an original feature in the glass pipeline industry.

Work on the installation will begin in January, 1961 and is due for completion in April, 1962.

D.S.I.R. and Monsanto Grants to Leeds University

Leeds University has received a donation of £6,000 from the Department of Industrial and Scientific Research to purchase a linear diffractometer for the Department of Inorganic and Structural Chemistry. The School of Chemistry has received £400 from Monsanto Chemicals Ltd.

S.A.I.'s NEW FERTILISER PROCESS

Production Difficulties with Potassium Metaphosphate Overcome

MANUFACTURE of granular potassium metaphosphate from phosphoric acid and potassium chloride at relatively low temperatures is achieved by a new process which has been developed and patented by Scottish Agricultural Industries Ltd. The product is obtained in the form of hard, non-hygroscopic and non-corrosive granules, which can be used alone as a PK fertiliser or incorporated in NPK fertilisers.

Commercial exploitation of potassium metaphosphate as a fertiliser has hitherto been limited by manufacturing difficulties, particularly the need to use temperatures of around 900°C, the corrosive nature of the reactants at such temperatures, and the need to use relatively pure phosphoric acid or elemental phosphorus. In addition, the product thus obtained is in the form of a solidified melt which is difficult to convert to granules.

The S.A.I. process is claimed to overcome these disadvantages and to be particularly suited for the production of a technical grade of granular potassium metaphosphate from impure reactants such as wet process phosphoric acid and muriate of potash. A typical product contains 57% P_2O_5 and 37% K_2O, with a pH of about 6.0. It is for all practical purposes chloride-free and is substantially potassium metaphosphate.

Circulating Bed

In the process the reactants are added to a circulating bed of hot, preformed product particles to form a relatively thin skin on each particle. The reaction, which may be simply represented as $nH_3PO_4 + nKCl \rightarrow (KPO_3)_n + nHCl + nH_2O$ involves the elimination of water and the evolution of hydrogen chloride. The operating conditions are such as to enhance the reaction which is completed in a short time at temperatures as low as 450°C. A special reactor has been developed to carry out this process which, at the same time, allows the hydrogen chloride to be kept apart from the combustion gases and recovered as a useful co-product.

In a typical application of the process, as described in B.P. 832,011, defluorinated phosphoric acid and potassium chloride (60% K_2O) are fed as a slurry to the reactor, which may take the form of an insulated rotating drum, a trough mixer or any other suitable apparatus. Heat is obtained from recycle material, at about 500°C, which is simultaneously added to the reactor. The reacted material leaves the reactor at about 200°C in a relatively free-flowing condition, and passes to a countercurrent heated rotary kiln, from which it emerges fully reacted at about 500°C.

A portion of the material from the reactor goes to a rotary cooler, and is then screened into three fractions. Part of the product fraction, equivalent to the raw materials introduced into the system, is removed from the product hopper, the remaining product-size material overflowing into the fines hopper to be recycled with the fines and cracked oversize. Recycle material returns to the reactor via a recycle heater.

Outstanding features of potassium metaphosphate as a fertiliser include lack of phytotoxicity and freedom from chloride. Extensive pot and field trials have confirmed that the S.A.I. product is in no way different from pure potassium metaphosphate as far as agronomic behaviour is concerned. S.A.I. potassium metaphosphate has been successfully wet granulated with ammonium nitrate and potassium sulphate to give a number of NPK compositions. Storage and handling behaviour of these fertilisers is similar to those of conventional fertilisers in present use. Because potassium metaphosphate is partially hydrolysed in a wet granulation process and is soluble in ammonium nitrate solution, the water-soluble P_2O_5 content of fertilisers based on potassium metaphosphate and ammonium nitrate may be as high as 50% of the total.

A booklet briefly outlining the new process and discussing possible applications for potassium metaphosphate has been published by Scottish Agricultural Industries Ltd., 39 Palmerston Place, Edinburgh 12. It includes a photostat copy of the complete patent specification in which the process is claimed.

Fisons to Feature Chemical Know-how and New Farming Techniques at Moscow

POTENTIAL market in the Soviet Union for British industrial experience and chemical know-how will be the keynote of the Fisons' exhibit at the British Trade Fair to be held in Moscow in May. During the past year, Soviet technical missions have visited the U.K. as guests of Fisons and return visits have been made by the company.

In addition to technical experience, products immediately suitable for the Soviet market, including pharmaceuticals and veterinary preparations, will be featured.

A dominating theme of Fisons' stand at the Fair will be the company's important contribution to British agriculture, and display panels will illustrate how fertilisers and spray chemicals have played a vital part in raising crop yields. Fisons Fertilisers Ltd. will be shown to have developed, as a result of advanced scientific research, different fertilisers for varying farm crops grown on contrasting soils. The company's extensive research effort and its highly efficient production techniques will be stressed.

The trade fair will also mark the start of a new effort by Fisons to introduce Imposil, an intramuscular iron injection for pigs, widely used in Britain and overseas. This is produced by Benger Laboratories Ltd., who will have a place on the Fisons exhibit. A significant market for this product may exist in the Soviet Union.

Designer of the Fisons stand, Mr. F. M. Gross, is creating for the occasion a striking 17 ft. high symbolic structure —an illuminated glittering ear of barley worked in highly polished brass to depict crop feeding and crop protection and underline the major theme, 'Fisons in Agriculture'.

Artist's impression of the proposed stand for Fisons at the Moscow Trade Fair

Good Year for Glaxo Sees New Collaborative Research Arrangements

SEARCH for new medicaments continues to absorb a major part of the rising research expenditures of Glaxo Laboratories Ltd., states chairman Sir Harry Jephcott in his annual report for the year ended 303 June (see also 'Commercial News', p. 908). In an attempt to keep the group's outlays of that nature within reasonable bounds, Glaxo have entered into a number of collaborative arrangements both with other companies and with certain governmental bodies.

Home sales were cut by an unusually mild winter with a comparatively low incidence of the commoner winter ailments. In some overseas areas, the persistence of uneconomic prices for antibiotics, due to the continuing surplus capacity of some major producers, appeared to have become part of the normal trading pattern. In those circumstances, the group's efforts had been concentrated on the speedy introduction and vigorous promotion of new products in both the human and veterinary fields.

The favourable year's trading was largely due to success in those directions. Some of those products had already found wide acceptance and Glaxo would continue to expand and develop the markets established for them. Profits from their sale, however, were not expected to continue to grow at the present rate. Since success attracted competition it might prove difficult to maintain the present profitability of those new products.

Parent company home sales had been maintained despite adverse seasonal conditions and despite a series of major price cuts. Ministry purchases of polio vaccine were appreciably less. The reception to new immunological products for both domestic and farm animals had been particularly encouraging.

Overseas, the main concern had been to develop world-wide interest in griseofulvin, the new antibiotic for the treatment of fungal conditions of the skin, hair and nails.

Accounts of Allen and Hanburys showed a further improvement with profit exceeding that of any previous year. Murphy Chemical Co. continued to progress and both turnover and profitability were higher than ever.

Sales of drugs and medicines to the National Health Service by Glaxo and Allen and Hanburys now accounted for no more than a modest fraction of group turnover. During the 12 years of the N.H.S. basic wage rates had risen over 70% and raw material prices by more than 20%. During that period no prices of antibiotic or other pharmaceutical preparations had been increased; prices of most had been steadily and materially cut so that over the 12-year period the prices paid by the N.H.S. to Glaxo had fallen on average by no less than 6½% a year.

Sir Harry concludes his report by stating there is every reason to expect that it will prove much more difficult to maintain last year's level of trading and profitability in the coming 12 months.

The report and accounts are accompanied by a well-illustrated booklet dealing with the Glaxo group's global operations. It tells something of the progress of the plans for co-ordinating manufacturing and marketing resources overseas which are now being put into operation, as well as the scale of overseas installations.

Winsford Extensions Treble Capacity for Rock Salt

MAJOR extensions to I.C.I.'s rock salt mine—only one in the U.K.—at Meadow Bank, Winsford, Cheshire, were opened by the Minister of Transport, Mr. Marples, on 21 November. Costing some £½ m., the extensions have raised the mine's production capacity to 300,000 tons/year.

Main features of the new scheme include the installation of an underground primary crushing plant, a skip system of elevating salt to the surface, and the introduction of diesel dumpers for transportation of salt in the mine. In addition, an entirely new system of forced ventilation has been installed. On the surface a second, third and fourth stage crushing and screening plant has been built, together with a new bagging plant and an overhead belt conveyor system to outside storage sites.

Most of the Meadow Bank output of rock salt is used for clearing roads of ice and snow. More roads are being treated with salt in winter than ever before, and the demand has risen rapidly. With the building of new roads and the growth of improved techniques to keep them safe in winter, even larger quantities of salt are likely to be required. To keep pace with these developments, the productive capacity of the Meadow Bank rock salt mine at Winsford has been trebled.

Dunlop Gift to Birmingham University

Dunlop Rubber Company Ltd. have entered into a Deed of Covenant to pay £10,000 a year for seven years to Birmingham University.

Sulphuric Acid Use up 100,000 Tons in 1959

MONTHLY returns by sulphuric acid manufacturers in the U.K. show that in the third quarter of this year production of sulphuric acid and oleum (100% H_2SO_4) reached 669,848 while consumption for trade uses totalled 673,139 tons, compared with the third-quarter 1959 figures of 566,451 tons and 572,162 tons, respectively. The National Sulphuric Acid Association Ltd. has issued the following quarterly summary, which excludes all Government plants. The trade use designated 'Acids—organics and miscellaneous' was in previous reports shown in 'unclassified' uses.

SULPHURIC ACID AND OLEUM
1 July—30 September
(*Tons 100% H_2SO_4 (New Acid)*)

	Contact	*Chamber and Tower*	*Total*
Stock, 1 July ...	62,904	19,976	82,880
Production ...	567,257	102,591	669,848
	630,161	122,567	752,728
Stock, 30 Sept. ...	67,154	19,322	86,476
Apparent use ...	563,007	103,245	666,252
Total capacity represented (tons/quarter)	623,570	137,460	761,030
Per cent of capacity in use	91.0	74.6	88.0

CONSUMPTION
1 July—30 September

	Tons 100% H_2SO_4
Acids—organics & misc.	9,201
Accumulators	3,101
Agricultural	11,737
Bichromate & chromic acid	5,541
Bromine	5,822
Clays (Fuller's earth, etc.)	3,199
Copper pickling	577
Dealers	3,314
Drugs & fine chemicals	4,922
Dyestuffs & intermediates	24,179
Explosives	2,311
Export	3,476
Glue, gelatine & size	190
Hydrochloric acid	12,978
Hydrofluoric acid	3,813
Iron pickling (incl. tin plate)	31,278
Leather	920
Lithopone	2,916
Metal extraction	572
Oil refining & petroleum products ...	19,789
Oils (vegetable)	2,401
Paper, etc.	2,332
Phosphates (industrial)	899
Plastics, not otherwise classified ...	17,401
Rayon & transparent paper	67,841
Sewage	2,994
Soap, glycerine & detergents	30,463
Sugar refining	192
Sulphate of ammonia	70,656
Sulphates of copper, nickel, etc. ...	3,191
Sulphate of magnesium	35
Superphosphates & other phosphatic fertilisers	148,217
Tar & benzole	5,608
Textile uses	3,548
Titanium dioxide	117,347
Unclassified	50,178
Total	673,139

R.I.C. 1961 Conference for Southampton

Annual conference, 1961, of the Royal Institute of Chemistry will be held in Southampton on 20, 21 and 22 April. An important feature of the event will be an all-day symposium on 20 April on 'Chemicals from petroleum'. Annual general meeting will be held at the University on 21 April and will be followed by an address by Sir Harold Hartley, Hon. F.R.I.C.

Overseas News

SWISS CHEMICAL EXPORTS SHOW INCREASE OF 19% LAST YEAR

ACCORDING to the Schweizerische Gesellschaft für Chemische Industrie, Switzerland's chemical exports last year totalled S.Fr.1,115 million (some £93 million), an increase of 19% on the previous year's total. The share of chemicals in total Swiss exports thus rose from 16.8% in 1958 to 18.3% last year.

Of the overall chemical export total, some 34.5% (34%) went last year to the Common Market bloc and only 13.6% (13.8%) to fellow-members of E.F.T.A. Main buyers of Swiss chemicals in 1959 were West Germany, Italy, France, U.S. and U.K.

Switzerland's imports of chemicals for the year totalled some S.Fr.770 million, or about £64.25 million, as against only S.Fr.613 million (some £51 million) in 1958. The share of chemicals in the country's import programme thus rose from 8.4% to 9%. The Common Market bloc provided as much as 65% of the total chemical imports, compared with a share of only 61% the previous year, while E.F.T.A. members stayed at the 1958 level of 9.5% of the total.

Mexican Ultimatum on Sulphur Royalties

The American-controlled sulphur company, Azufrera Panamericana, is being given an ultimatum to terminate the arrangement whereby royalties are paid to two Mexicans and one American who, some time back, ceded their concessions to this company. Royalties from 1954 to date total nearly £3 m., and are considered by the Minister of National Property to be an excessive burden on sulphur production.

Allied Plan Chlorine-Caustic Expansion

Two expansions are planned by the Solvay Process Division of the U.S. company, Allied Chemical at their Moundsville plant. Production of chlorine-caustic will be increased by 20,000 tons per year when new facilities are completed in 1961. The increased chlorine production will fill captive requirements in making chlorinated methanes, the production capacity of which is to be increased by 40%. Some of the captive chlorine will also be used in the manufacture of vinyl chloride.

Super-tough Ceramic-steel Developed in Germany

The Pfaudler-Laboratorien concern of Schwetzingen, West Germany, announce the development of a new ceramic-coated steel which is claimed to be impervious to corrosion from hydrogen chloride, chlorine and sulphur dioxide at temperatures of up to 650°C. No oxidation of the basic metal takes place after a short exposure to temperatures as high as 870°C. Resistance to temperature change is stated to be four times better than with enamelled steel.

A heat conductivity considerably superior to that of porcelain, SiO_2, laboratory glass or Al_2O_3 of comparable wall thickness is also claimed. Tensile strength of the ceramic layer is as high as 6,000 kg./cm², i.e. comparable with that of tough steel, while abrasion durability values are three times better than those of laboratory glass.

Du Pont Acrylonitrile Plants Will Add to U.S. Overcapacity

Du Pont's first acrylonitrile plant at Memphis, Tenn, has come on stream with an initial capacity of 50 million lb./year. Construction of a second plant at Beaumont, which should be in operation by the end of 1961, has been started. Using an ammonia-propylene route, potential output will also be about 50 million lb./year. The first plant is based on acetylene-hydrogen cyanide.

Total U.S. demand for acrylonitrile is between 240 and 250 million lb./year; 1960 production is expected to total just under 400 million lb., giving overcapacity of some 150 million lb. By 1962, U.S. capacity will be just under 450 million lb., but demand is not expected to be much more than 300 million lb.

Explosion Due to Nitrobenzene, Nitric Acid and Water

The explosion which occurred at the Kingsport plant of Tennessee Eastman Co. on 4 October, is now believed to be due to the detonation of a mixture of nitrobenzene, nitric acid and water. It has been concluded that a substantial concentration of water was present at the time of the explosion. The violence of the explosion indicated that the mixture was detonated with a speed and power comparable to TNT.

Tennessee Eastman point out that this experience is a warning of the great potential dangers associated with a mixture of nitrobenzene and nitric acid even with substantial quantities of water present.

400 Million lb. of U.S. Polypropylene by 1962

By 1962, total U.S. polypropylene capacity will have risen from its present level of 100 million lb. to some 400 million lb. This increase is partly the result of the opening in 1962 of a new polypropylene plant near Philadelphia by Shell Chemical Co., a subsidiary of the Shell Oil Co. To cost some $20 million, this plant will have an annual capacity of 80 million lb. As stated earlier, a Shell process is to be used, but no details are available. Other plans have been announced for polypropylene production by 1962 by companies including Standard Oil of New Jersey, Hercules Powder, Dow Chemical, Eastman Kodak, Firestone Tire and Rubber and the American Viscose-Sun Oil subsidiary, Avisun.

Soviet Rubber Unit's Delayed Start-up

The opening of a synthetic rubber plant at Kubyshev-on-the-Volga, which should have taken place in August of this year, has been held up due to difficulties in plant deliveries and material flow.

Carbide Plant and Chemical Complex Planned for Norway

The Norwegian concern A/S Hafslund-Karbidfabrikken, of Hafslund, plan the erection at Verdal, Norway, of a plant to produce initially 40,000 tonnes/year of carbide, which will probably be raised later to 120,000 tonnes/year. To be opened in late 1963 or early 1964, the raw carbide plant is expected to be the centre of a chemical complex whose main products would be based on acetylene. The raw carbide plant would cost some 50 million Norwegian crowns (£2½ million), of which the Norwegian Government is expected to supply some 10 million crowns.

The Hafslund company is said already to be making foreign contacts for the promotion of the chemical-complex project based on the Verdal plant.

U.S. Plant Firm Sets Up European Subsidiary

The Wilmington, California, chemical plant concern, Turco Products Inc. have set up a European subsidiary at Zug, Switzerland, with the name of Turco AG.

Reilly Tar Raise Pyridine Price by Six Cents

Reilly Tar and Chemical Corporation, Indianapolis, Ind., have raise the price of pyridine 6 cents per lb., from 16 November for spot sales and 1 January, for contract sales. New prices, f.o.b. Indianapolis and freight equalised, are: tankcar, 71 cents/lb.; truckload, drums, 75½ cents/lb.; and l.c.l., drums, 76 cents/lb.

Chemical Process 'Welds' Nylon to Metal

A new two-step process for chemically 'welding' nylon to metal has been developed by Plastic Associates, Laguna Beach, California. The process is said to be particularly suitable for the bonding of nylon gears to metal shafts, and for the securing of threaded screws or rods in nylon-and-metal assemblies. Hitherto the self-lubricating qualities of moulded nylon have generally required a complicated mechanical interlock arrangement to prevent slippage between the nylon and the metal.

In the new chemical welding method,

an epoxy paste is used which chemically unites with the metal surface on which it is applied. A separate solvent solution applied to the nylon part softens the surface and allows the nylon molecules to blend with the epoxy bonding agent as the latter hardens. The entire operation is performed at room temperature, achieving, it is claimed, an extremely tough, shock-resistant union between the nylon and the metal within a few hours.

Second New Gas/Sulphur Project for Alberta

A $13 m. gas processing and sulphur manufacturing plant to be built near Calgary, Alberta, will be largely owned by Mobil Oil of Canada and Jefferson Lake Petrochemicals, and operated by the latter company. Construction is to start immediately.

As reported in CHEMICAL AGE last week (p. 865), Shell Oil Co. of Canada are to build a $20 m. gas processing and sulphur plant, also in Alberta, in the Pincher Creek district.

Petrochemical Expansion for Esso's Cologne Refinery

The German Esso subsidiary, Esso AG, have announced plans to invest a further DM50 m. (some £4½ m.) in their Cologne oil refinery, this money to be spent mainly on the expansion of the petrochemical plant there. Olefin production at present accounts for only 7% of the refinery's output; during next year this share will be raised to 14%. The new petrochemical plant will be opened in mid-1961 and, with existing units, will cover half the Cologne site. By then as much as DM110 m. of the total investments of DM285 will have gone to petrochemical output.

Du Pont-Japanese Agreement for Neoprene Approved

Formation of a new company, Showa Neoprene K.K., to be owned equally by E. I. Du Pont de Nemours and Showa Denko, Tokyo, has been approved by the Japanese Government. The new company will start construction early in 1961 on a neoprene plant at Kawasaki. With an 18 million lb./year capacity, the plant will be completed in the second half of 1962.

According to *Chem. and Engng. News*, 47, **38**, 21, Du Pont's annual U.S. capacity is now about 320 million lb.; they also have a 50 million lb. plant at Maydown, Northern Ireland. The 11 million lb./year plant of Bayer at Leverkusen is being expanded to about 50 million lb. U.S.S.R. capacity is estimated at 65 million lb./year, with plans to boost this to about 385 million lb.

Third New Phthalic Unit Planned for Netherlands

Chemische Industrie Uithoorn N.V., Uithoorn, are to extend production with a 5,000 tons/year phthalic anhydride plant. A joint subsidiary of the asphalt firm, Utrechtsche Asphalt, and the ferrous metals company, Koninklijke Nederlandsche Hoogovens en Staalfabrieken N.V., they are to open the new plant by mid-1962.

This is the third phthalic unit due to be opened by 1962 in the Netherlands. The Dutch State Mines, Staatsmijnen in Limburg, who already produce 2,700 tonnes/year, will next April open a new plant with an annual capacity of 5,000 tonnes. February 1961, is the on-stream date for a 1,200 tonnes/year unit being built at Schoonebeek by Alchemica N.V., a newly formed subsidiary of the Scado-Archer-Daniels concern of Zwolle.

New Montecatini Fertiliser Plant for Sicily

A 6,000 million lire plant with an output of 50,000 tonnes/year is being built by Akragas, a member of Montecatini Group, for the production of binary and ternary fertilisers at Porto Empedocle, Sicily. The plant is expected to be ready in about a year.

It will give employment to about 120 persons.

Si-N Resins Produced

Dr. Rochow of Harvard University sees no reason why he cannot make Si-N elastomers, so he told the XXXII International Congress of Société de Chimie Industrielle held in Barcelona. He has already succeeded in making resins by crosslinking polymers with a Si-N backbone. Dr. Rochow added that the Si-N backbone might be used to make heat resistant plastics. The Si-N framework for polymers would be nearly as strong as the silicone framework, and the nitrogen compounds can give coordination polymers.

Esso Nederland Form Chemicals Department

The Dutch subsidiary of the international Esso group, Esso Nederland, have formed a special chemical products department.

Foster Wheeler Cancel Indonesia Fertiliser Plant Contract

Foster Wheeler Corporation have cancelled a contract with the Government of Indonesia, signed in May 1959, for the building of a synthetic fertiliser plant on Sumatra at a cost of $30 m. The building of the plant had been put off several times by the Government since no agreement could be reached as to the future Indonesian staffing of the works.

Polymer's Synthetic Rubber Plant for Strasbourg

As part of their recently announced plans to start production on a site purchased near Strasbourg of rubber (C.A., 5 November, p. 757), the Polymer Corporation, Ontario, are to convert their French study subsidiary, Polymer Corporation (France), into a production company. The projected N.Fr.200 million plant will also produce other organic chemicals from feedstock to be supplied from oil refineries that are planned in the same area.

Montecatini Plant in Sicily Produces 200 Tonnes/year of Potassium Salts

WITH a capacity to produce some 200,000 tonnes/year of potassium sulphate and other products, Montecatini's new plant at Campofranco, Sicily, recently inaugurated, forms an important part of the Group's kainite mining and fertiliser manufacturing operations in Southern Italy. Some 50% of the Campofranco plant's output will be exported; the rest will be utilised for the production of compound fertilisers based on potash—some of it by Akragas, one of the Montecatini companies, at their Porto Empedocle facilities, to which a 50,000 tons/year plant is now being added (see above).

At Campofranco, the manufacture of potassium salts starts with the bringing of kainite from the San Cataldo mine by a ropeway 18 km. long which delivers it to a 20,000 tons' capacity storehouse. From that point onwards, a continuous cycle of production is ensured by a perfectly timed materials handling and processing schedule. The handling of large quantities of kainite and schoenite has made it necessary to install an extensive conveyor-belt system with a daily capacity of 5,000 tonnes. In addition, process and cooling requirements call for an enormous quantity of water and to ensure an adequate supply, a 1 million cu. m. reservoir has been built to store water from the Platani River against the periodical dry season.

Kainite is subjected to two leaching operations and, as the chloride and sulphate of magnesium are more soluble than the corresponding salts of potassium, the separation of solid potassium sulphate is achieved. The reaction vessels, fitted with turbine stirrers, have an aggregate capacity of 1,500 c.m. The centrifuges installed for continuous multi-stage separation of the salts are claimed to be the largest and most powerful ever built. The pumps for handling mixtures of crystals and liquors are capable of dealing with mixtures that contain up to 40% or 50% by weight of solids.

Water comes partly from the reservoir and partly from the spray cooling-tower circuit at the rate of over 2,000 c.m./hr. Automatic control is extensively used in the plant and supervision is carried out by means of a central control panel.

Potassium sulphate is produced at Campofranco in three different grades, of 50-52 and 48-50 and 38-40% K_2O, respectively. The chemical is dried, passed through grading seives, cooled and then conveyed into 88-ft. high cylindrical silos each of which can hold 2,000 tonnes of the product.

Obituary

Lord Stansgate

WE deeply regret to record the death of **Viscount Stansgate,** P.C., D.S.O., D.F.C., on 17 November at the age of 83. Lord Stansgate was the second son of Sir John Williams Benn, founder of *The Cabinet Maker*, from which the present publishing business of Benn Brothers Ltd., contolling 15 trade and technical journals, has developed.

William Wedgwood Benn was one of the second generation of the family to enter the business when it was still in its early stages of development around the turn of the century. In 1903 he edited the 'C.M.' when it had offices in City Road. In later years he was always proud to recall his association with the 'C.M.' and, long after he had ceased to take any active part in the business, he was a welcome visitor at the firm's social gatherings where the warmth and vigour of his personality and his wit as a speaker won him an affectionate regard from all who came in contact with him.

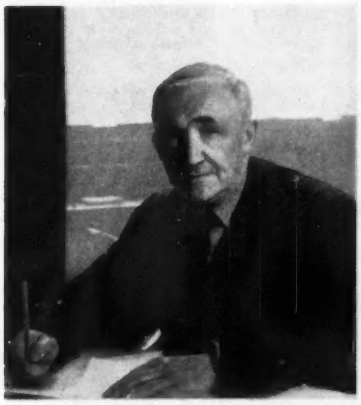
But it was public and political life which appealed to him far more than business. While his elder brother—Sir Ernest Benn—who had entered the business in 1891 remained to become the 'architect' of Benn Brothers Ltd., Lord Stansgate relinquished his business activities in 1906 to enter Parliament as Liberal M.P. for the St. George's Division of Tower Hamlets, his father's first seat, and he continued to represent it until 1918. Except for a few years in the 1930's, he remained an M.P. until the viscounty was conferred on him in December, 1941.

Although the two brothers were also to diverge in their political viewpoints, both Sir Ernest Benn and Lord Stansgate always brought to their activities the same spirit of independence of mind and fearless championship of any cause in which they became involved.

Lord Stansgate will long be remembered for the alacrity with which he always leaped to the Parliamentary attack over any form of what he felt was an injustice or an interference with personal freedom. The vigour and frankness with which he expressed his opinions was typical of the deep convictions he held and his qualities of courage and integrity. But such was his charm of manner, that, however fierce his criticisms, he never lost the friendship and respect even of those who were his target.

Whatever his party allegiance, he still remained liberal—in the widest sense of the word—in his thought and actions and he will be greater missed for what *The Times* described as "the flashing blade of his scorn for injustice, indolence, equivocation or woolly-mindedness in high places."

Lord Stansgate had both a distinguished political and war record. As far back as 1910 he was a Junior Lord of the Treasury and, following his decision to join the Labour Party in 1927, he was appointed Secretary of State for India in 1929, holding office until 1931. He was again in office in 1945, under the then Mr. Attlee, as Secretary of State for Air when he had to cope with the many problems of demobilisation and adjustment from war to peace footing.



The late Lord Stansgate

In the First World War he fought at Gallipoli and then joined the Egyptian R.N.A.S. Seaplane Station as observer and won the D.S.O. at the sinking of the Ben-my-Chree. In the last year of the war, flying on the Italian front, he was awarded the D.F.C. and Chevalier of the Legion of Honour.

In the Second World War, when he was 63 years of age, he was accepted for re-entry into the R.A.F. and for a time was a Director of Public Relations at the Air Ministry.

In view of his devotion to Parliamentary life, in which he showed a remarkable grasp of procedure and debating tactics, it was fitting that the year after finally leaving Government office in 1946 he should be elected president of the Inter-Parliamentary Union. In addition to entering into this work with characteristic energy, he was in the thick of political controversy in the House of Lords where he provoked many lively discussions and helped to give it a new lease of authority from the quality of its debates. It was while attending the House of Lords that he was taken ill only the day before he died.

Our sympathy is extended to Lady Stansgate and two surviving sons—the eldest is the Hon. Anthony Wedgwood Benn, former M.P. for South-East Bristol.

U.K. Firms Prefer Chemical Assay for Pesticide Residue in Foodstuffs

EXCEPT for 'Shell' Research and Geigy AG, manufacturers' laboratories make little use of bioassay for pesticide residues in foodstuffs. This is stated in a report to the Analytical Methods Committee by P. H. Needham which was presented at a joint meeting of the Biological Methods Group with the Pesticides Group of the Society of Chemical Industry on 12 October (*The Analyst*, November 1960, p. 792). Investigations were carried out with a view to the possible development of a rapid "sorting test" for detecting or determining toxic pesticide residues in food and to find the extent to which bioassays are used for this purpose. Laboratories from which information was obtained included those of pesticide manufacturers, public analysts and official government and other institutes engaged in research or advisory work on pesticides.

It was found that, except for the firms already mentioned, no laboratories use routine bioassay. Some do not use bioassay at all, and others have techniques available that are used only when chemical methods of assay for a particular pesticide are unavailable or give unreliable results. In England, no public analytical laboratory using bioassay for pesticides was found at all. However, on the Continent there are laboratories which regard this type of assay essential since it is considered less time consuming than the chemical methods for sorting samples into those containing a pesticide and those not. Bioassays are also regarded by some as satisfactory methods for assaying the pesticides in samples. It was emphasised, however, that bioassay alone is not satisfactory.

Among the companies using bioassay techniques for residue determinations in connection with the development of new compounds and new applications of existing ones, are Shell, Du Pont, Monsanto and Dow. 'Shell' Research Ltd. was the only laboratory visited in England in which bioassay was used as a routine measure for residues. At the Fisons Pest Control station bioassay of residues is not routine and I.C.I. rely almost entirely on chemical analysis for the assay of insecticide residues in plant and animal material, although bioassay methods have been developed for use where necessary.

Wills

Mr. Leonard Max Hesse, London area manager of the Geigy Company Ltd., who died on 13 July, left £8,980 net (duty paid £360).

Mr. Saul Victor Taylor, senior director and a founder of Cuties (Rodmill) Ltd., and Rodmill Chemical Co. Ltd., Liverpool, who died on January 28, intestate, left £15,698 gross, £15,212 net.

Bookshelf

Adequate Coverage of Current Industrial Processes

APPLIED ORGANIC CHEMISTRY. *E. Kilner* and *D. M. Samuel*. Macdonald and Evans Ltd., London, 1960. Pp. xi + 484. 50s.

Among the many good textbooks of organic chemistry available to the student, very few deal adequately with current industrial processes. The present work stands out in this respect, since it effectively combines the treatment of pure organic chemistry with a most useful account of the technology of the subject.

The layout is such that the major classes of simpler organic compounds are covered with a brief description of the properties and uses of each substance which has industrial interest, while manufacturing processes are described in each case. In fact the book deals with the production and uses of both heavy and fine organic chemicals, as well as petroleum products, oils, detergents, textiles, high polymers and dyestuffs. The industrial processes given are largely of current importance.

The book, which is attractively bound and printed, will be of considerable value to chemistry students up to B.Sc. level. While the lack of references to the original literature must reduce its usefulness at a more advanced stage, this book should not be overlooked by the established chemist. The price is fair at 50s.

J. H. TURNBULL

Fluorine Chemistry

ADVANCES IN FLUORINE CHEMISTRY. VOL. 1. Edited by *M. Stacey, J. C. Tatlow*, and *A. G. Sharpe*. Butterworths, London, 1960. Pp. viii + 203. 45s.

In the introduction it is stated that the editors have for some years been trying to write a book on fluorine chemistry but have found the mounting literature too much for them. They have resorted to an 'Advances' series which is not a satisfactory substitute. Instead of a considered overall review there is a series of disconnected articles which are not fitted into a general framework. Although a claim for a distinctive 'fluorine chemistry' is stressed in the introduction, there is no discussion of the reasons for the unique properties of the compounds. One might have hoped for such an article in the first volume of a series which covers: the halogen fluorides—their preparation and uses in organic chemistry, W. K. R. Musgrave; Transition metal fluorides and their complexes, Sharpe; Fluoboric acids and their derivatives, D. W. A. Sharp; The electro-chemical progress for the synthesis of fluoro-organic compounds, J. Burdon and Tatlow; Exhaustive fluorinations of organic compounds with high-valency metallic fluorides, Stacey and Tatlow. Readers who require information on these topics will find the articles well documented with references to the British and U.S. journal and patent literature. The price is reasonable for a book of this size and type.

Vacuum Symposium

VACUUM TECHNOLOGY TRANSACTIONS, PROCEEDINGS OF THE SIXTH NATIONAL SYMPOSIUM. Edited by *C. Robert Meissner*. Pergamon, London, 1960. Pp. xvi + 334. £6.

This book, an annual publication of the American Vacuum Society, consists of 58 papers presented at the Sixth National Symposium at Philadelphia. The papers are classified as follows: The role of spectroscopy in vacuum science, highland ultra-high vacuum systems; vacuum measuring techniques; vacuum system applications; applications of vacuum system components; thin films and vaporising sources; vacuum system components; ionic pumping.

These volumes are the only up-to-date reviews of progress in this diversified field and are invaluable sources of reference for those interested in vacuum techniques. The latest volume also contains cumulative author and subject indexes of the 1954-59 symposia, and in keeping with the others of the series is extremely well produced.

Ligand-field Theory

AN INTRODUCTION TO TRANSITION-METAL CHEMISTRY: LIGAND-FIELD THEORY. By *L. E. Orgel*. Methuen, London, 1960. Pp. 180. 25s.

The author has aimed at the best of all publics, the intelligent honours student. He has written a non-mathematical treatment of ligand-field theory, to which he has himself made such notable contributions, and explored its interpretations of the chemistry of transition metals, in particular, those aspects of their chemistry which have recently been most fashionable. The result is an introductory essay of moderate length that should appeal to students and to those who were at university before the advent of the modern theories. In keeping with the author's aim references are to review articles except when the absence of a suitable review makes it necessary to cite original papers. The book is crown octavo but there is little more on the page than in the larger of Methuen's monographs.

Though today complaints about an excess of scientific literature frequently arise, books by pioneers in fields of research are not too common. Orgel's work should be well received.

It may be noted that it is modish for theoretical chemists to dismiss briefly the work of other schools of thought. In the latest edition of Pauling's "Nature of the Chemical Bond", molecular orbital theory receives little mention. Orgel writes "Pauling's valence bond theory is not described since his own classic writings make such description unnecessary".

Practical Organic

PRACTICAL ORGANIC CHEMISTRY, 4TH EDN. By *F. G. Mann* and *B. C. Saunders*. Longmans Green, London, 1960. Pp. xix + 585. 25s.

The newest edition of this well-known text has the same format as its predecessors, and includes all the previous experiments plus a considerable amount of fresh matter. The greater part of the expansion is in Part II (preparations) and a number of standard reactions have been added to meet the needs of the honours student, but, apart from 10 pages on simple chromatography, there is no provision for anything approaching the special techniques course now normally given to honours students.

The new preparations include some fresh heterocyclic syntheses, the Michael reaction (preparation of dimedone), the Meerwein-Ponndorff reduction (of benzophenone), and reduction with lithium aluminium hydride.

As the new matter has been added on to the original, the choice of experiments is large, and the task of selection is turned into an exasperating problem by the absence of any but the most rudimentary table of contents. Weakest feature of the older editions was Part III, on qualitative analysis, and, regrettably, this state of affairs is perpetuated. While doubtless adequate for the restricted range of compounds for which it is designed, it provides a poor introduction to the fundamentals of organic qualitative analysis.

Toxic Agents

LABORATORY HANDBOOK OF TOXIC AGENTS. Edited by *C. H. Gray*. Royal Institute of Chemistry, London, 1960. Pp. viii + 170. 20s.

The publishers describe this book as the first of a series of special-purpose books produced as a general service to chemistry; some will replace items in the 'Lectures, Monographs and Reports' series. The book is divided into, introduction (12 pages), precautions and preventions (12 pages), first aid in the laboratory (10 pages), poisonous and corrosive gases, reagents and solvents (114 pages) precautions against radiations (18 pages), and glossary (2 pages). The book is stoutly bound and should serve as a convenient reference guide. Chemists might well have individual copies which they should be encouraged to read and subsequently consult when they work with any material with which they are not perfectly familiar. This is essentially a book to forewarn. Non-chemical laboratory hazards such as electrocution are not covered.

People in the News

● **Mr. Roy Clark,** a senior research chemist with Peter Spence and Sons Ltd., Widnes, has left to take up an appointment with the Polymer Corporation Ltd., Ontario.

● **Mr. K. W. Palmer,** joint managing director of I.C.I.'s Heavy Organic Chemicals Division, received an award for 30 years' service with the company at a recent long-service presentation by **Mr. C. Paine,** I.C.I. main board director. **Mr. R. B. Richards,** division research director, received an award for 20 years' service.

● **Mr. G. H. Edwards,** director and chief chemist of Weston Research Laboratories Ltd., 644 Bath Road, Taplow, Maidenhead, the scientific consultants of Associated British Foods Ltd., has resigned his post to take up a senior appointment in the Packaging Technology Division of the Metal Box Co.'s research department. **Mr. J. R. Windass** has been appointed acting chief chemist of Weston Research Laboratories.

● **Mr. A. K. Ames** (I.C.I. Dyestuffs Division) was elected chairman of the British Colour Makers' Association, in succession to **Mr. H. Gosling** (Cornbrook Chemical Co.) at the recent annual meeting. Other officers elected were: Vice-chairman, **G. E. Hillier** (J. W. and T. A. Smith Ltd.); hon. treasurer, **Sir Christopher Cowan** (Cowan Bros. (Stratford) Ltd.); Council, **A. K. Ames, Sir Christopher Cowan, G. E. Hillier, H. Gosling, J. H. Grimshaw** (Horace Cory and Co. Ltd.), **C. L. Lewis** (Joseph Storey and Co. Ltd.), **H. Pike** (Hull and Liverpool Red Oxide Co. Ltd.), **J. Smethurst** (James Anderson and Co. (Colours) Ltd.), **V. Watson** (Cromford Colour Co. Ltd.); secretary, **Allan J. Holden, B.Sc., F.R.I.C.**

The association held its 11th annual dinner on 9 November, the retiring chairman, Mr. H. Gosling, presiding. Principal guest was **Sir William Palmer, G.B.E., C.B.,** chairman of the Dyestuffs Advisory Committee.

● **Mr. A. S. D. Barrett, B.Sc.(Eng.), M.I.Mech.E., M.I.Chem.E.,** has been appointed consultant to Research and Control Instruments Ltd., 207 King's Cross Road, London W.C.1, and joined the board on 16 November. Before setting up a private consultancy practice at the beginning of this year, he was technical director of Edwards High Vacuum Ltd.

● **Dr. Roland S. Hannan,** 41, who has joined T. Wall and Sons (Meat and Handy Foods) Ltd. as chief chemist, will take charge of new laboratories which are being built at Atlas Road, Willesden. The laboratories are expected to be completed next summer. Dr. Hannan and his staff of 36 will have microbiological and analytical control of out-going and incoming supplies and will conduct research into new developments and improved products.

● **Mr. E. Holdsworth** has been appointed northern sales representative for Epok surface coating resins, manufactured by British Resin Products Ltd., and will operate from the B.R.P. office in Altrincham, Manchester. **Mr. W. A. Wood,** formerly the northern representative, has been transferred to London and the south of England where he joins **Mr. S. Hodgson** and replaces **Mr. A. H. Fletcher. Mr. R. H. French** continues as Midlands representative operating from Birmingham.

● **Mr. J. F. C. James,** who for the past seven years has been responsible for service and pyrometer supplies for Honeywell Controls Ltd., Birmingham office, has been appointed technical sales representative for the Midlands area for Sifam Electrical Instrument Co. Ltd., manufacturers of electrical and temperature measuring instruments, Woodland Road, Torquay, Devon.

Dr. J. Harley Mason, Professor of Chemistry, Cambridge University (left), discusses the structure and chemistry of the alkaloid Calycanthine with Dr. J. J. Denton, head of organic chemistry research at Cyanamid International's Lederle Laboratories in Pearl River, New York. Dr. Mason visited the Cyanamid pharmaceutical laboratories during a recent visit to the United States

Shell Appoint Chemicals and Plastics Managers for Sales Regions

MANAGERIAL appointments in sales regions are announced by Shell Chemical Co. Ltd. following the recent establishment of two separate divisions to handle all products other than agricultural.

In Industrial Chemicals Division, the new Northern regional manager is **Mr. R. A. Taylor,** who moves from Glasgow where he was manager of Scottish sales region; **Mr. W. F. Williams,** previously solvents sales manager, Northern, becomes manager of Scottish sales region. **Mr. N. W. D. Dewdney,** who is appointed Midland regional manager, recently returned to the U.K. from India where he was with Burmah Shell; before that was a representative in various areas with Shell Chemical. As previously announced, **Mr. M. B. Creed** is manager of Southern sales region.

Mr. J. A. Hepworth, until recently Northern regional manager, has moved to the London head office of Industrial Chemicals Division to take up the appointment of regional controller.

Plastics and Rubbers Division have formed two new sales regions. **Mr. C. Duckworth,** previously Midland regional manager, is appointed manager, North sales region, Plastics and Rubbers Division, his area including the Midlands and Scotland. **Mr. J. A. Minch** is the new manager for the division's South sales region.

J. A. Hepworth

C. Duckworth

J. A. Minch

R. A Taylor

W. F. Williams

N. W. D. Dewdney

M. B. Creed

Commercial News

- **Glaxo Group Profit Higher by 24%**
- **Metalin's Cadmium Colour Reorganisation**
- **Shell Chemical Company for Philippines**
- **Capital Increases for S.B.A., Magadi, Morson**

Glaxo Laboratories

Consolidated sales by Glaxo Laboratories and their subsidiaries at home and abroad were 11% higher in 1959-60 than in 1958-59. Group profit before tax rose 24.4% to £7,310,410 (£5,875,897). Tax took an estimated £3,550,000 (£2,858,000), leaving net profit after tax of £3,760,410 (£3,017,796). Parent company's net profit was £2,972,058, an increase of 23.1% on the 1958-59 figure of £2,412,940. The dividend is raised 4% to 18% and a one-for-four scrip issue is proposed. Annual meeting will be held at the Piccadilly Hotel, London W, on 12 December at 12.30 p.m. (See also page 902.)

Metalin Ltd.

From 1 January, Reckitt's (Colours) Ltd. will take over the cadmium colours business now carried on by Metalin Ltd., Chemical Works, Bletchley. Metalin are a member of the Reckitt and Colman Group and have been closely associated with Reckitt's (Colours) Ltd., Morley Street, Hull. The present move is due to internal reorganisation. Reckitt's (Colours) will operate the group's cadmium colours business under the name of 'The Metalin Company' from Bletchley and management and staff will remain unchanged, the business being carried on as before.

Chemstrand Corporation

Chemstrand Corporation have declared a dividend of $5 million to be divided between its two shareowners, American Viscose Corporation and Monsanto Chemical Co. Chemstrand's consolidated sales and earnings for the first nine months of 1960 were $152,844,000 and $19,316,000 respectively. A plan is in hand for Monsanto to acquire the Chemstrand holding of American Viscose.

Girdler-Sudchemie Katalysator

The German catalyst producers Girdler-Südchemie Katalysator GmbH, of Munich, have increased their share capital from DM250,000 to DM2,500,000. The company is owned jointly by the Chematron Corporation, of Chicago, and Süd-Chemie AG, of Munich.

Farbwerke Hoechst AG

Farbwerke Hoechst AG, Frankfurt-on-Main, have now made official application for their shares to be handled on the Brussels Stock Exchange.

Shell Chemical, Philippines

The newly-organised Shell Chemical Co. (Philippines) Inc., opened its doors for business last week. The corporation, capitalised at Pesos 2 million, is owned 60% by Filipino shareholders and 40% by Bataafse Petroleum Mij. N.V., The Hague. Main purpose of the new company is to order, import, blend, formulate, store, distribute and sell at wholesale, chemical products, and to carry on this business in all its branches, including research.

The company will take over the long-established chemical business of the Shell Co. of the Philippines Ltd. It will buy the chemical assets and absorb the chemical department staff of that company, and make use of the Shell name and Shell's chemical trademarks under licence.

Kopper India Pvt. Ltd.

Heinrich Koppers GmbH, Essen, who have constructed the complete plant for the processing of coke-oven gas at the German-built Rourkela steelworks in India, have formed an Indian subsidiary bearing the name Kopper India Private Ltd., Calcutta. The company will take care of the interests of Koppers and their German subsidiaries—which include the Essen apparatus firm Gesellschaft für Mess-und Regeltechnik mbH—in India.

Union Chimique Belge

Union Chimique Belge announce a gross profit of B.Fr.221,570,000 and a net profit of B.Fr.61,010,000 for the year ended 30 June. These figures compare with totals of Fr.201,650,000 and Fr.53,310,000, respectively, for 1958/59. Depreciation for the past period was Fr.143,460,000 (Fr.130,850,000).

S.B.A.

Société Belge de l'Azote et des Produits Chimiques du Marly (S.B.A.) announce a capital increase of from B.Fr.600 million to B.Fr.650 million. The company, Belgium's biggest nitrogen producer and an important pharmaceutical manufacturer, has taken this step to enable the absorption of the industrial plant of its subsidiary company, Société des Laboratoires Labaz. The latter company recorded a dividend for 1959 of 6%, while the parent company has a running loss of B.Fr.41,570,000.

Seichimie

The French holding company for chemical industry shares, Seichimie, who are controlled by Péchiney, announce a net profit of N.Fr.3,810,000 for the year ended 30 June 1960 (N.Fr.2,840,000). It is recommended that the dividend for the year be raised to N.Fr.3.60 (3.50) per share.

INCREASES OF CAPITAL

CHEMICOVENS LTD., chemical manufacturers, etc., Vintry House, Queen Street Place, London E.C.2. Increased by £15,000 beyond the registered capital of £20,000.

THOMAS MORSON AND SON LTD., manufacturing chemists, etc., Summerfield Chemical Works, Wharf Road, Ponders End, Middlesex. Increased by £350,000 beyond the registered capital of £50,000.

MAGADI SODA CO. LTD., Imperial Chemical House, London, S.W.1. Increased by £480,000 beyond the registered capital of £1,000,000.

Market Reports

STEADY TRADE IN INDUSTRIAL CHEMICALS

LONDON Trading conditions on the industrial chemicals market during the past week have been steady and, with few exceptions, prices are unchanged at recent levels.

Zinc oxide prices are 50s per ton lower as a result of the decrease in the price of the metal. Contract deliveries to the chief industrial outlets have been well up to schedule, and the flow of supplies to the textile and kindred trades has been satisfactory.

The market for agricultural chemicals is without feature and the firm position of the coal tar products market has been maintained.

MANCHESTER From the point of view of new business moderate activity is reported on the Manchester market for heavy chemicals. During the recent buying movement, however, good bookings had been made by home users as well as for shipment over the early months of 1961. Soda and potash products are mostly meeting with a steady demand, and there is continued pressure also for hydrogen peroxide, the ammonia compounds, borax, and a wide range of miscellaneous products. Quotations generally maintain a steady front. Mixed conditions are reported in the fertiliser section, with basic slag and the compounds at the moment attracting most attention.

SCOTLAND The level of trading during the past week in the Scottish heavy chemical market was again fairly active. Demands were varied and covered the usual range of industrial chemicals. Although there was some interest in forward requirements, the main emphasis was focused on immediate supplies. There is still a good volume of inquiries being received, with those pertaining to contract requirements for next year. Prices have remained reasonably steady, but some variation did take place.

TRADE NOTES

Silicone Coated Paper

Paper coated with MS 2219, a Midland Silicones Ltd. product, is, the manufacturers claim, the answer to sticking problems encountered in industry. Papers coated with silicones provide a non-stick backing, interleaving or envelope for all kinds of sticky materials even at high temperatures or in conditions of extreme humidity. The coating does not affect the material with which it is in contact, nor is it affected itself.

The uses quoted fall into five categories: packaging-bitumen, waxes, unvulcanised rubber, adhesives, confectionery and frozen foods; backing-contact adhesive labels etc.; interleaving unvulcanised rubber and plastics; casting bases for many types of plastics, especially urethane foams; and as baking paper.

New I.C.I. Polyurethane Rubber

Specially designed by I.C.I. Dyestuffs Division for fabric coating by the spreading technique, Daltoflex 1S polyurethane rubber is claimed to represent an important advance in the use of nylon and other synthetic fibres in the production of rainwear fabrics, for lightweight 'tarpaulins' and similar coated fabrics.

Available in the form of hard irregular pieces, Daltoflex 1S dissolves readily in solvents such as acetone, MEK, MEK/toluene and ethyl acetate/ethylene dichloride giving viscous solutions ideal for spreading. The non-volatile organic isocyanates, Suprasec K and Suprasec G, are incorporated to effect curing of the Daltoflex 1S (completed either by storage or a short heating), and the coatings produced are stated to possess excellent adhesion and flexibility, much superior to those of earlier types of coatings on fabrics of the nylon type.

Further advantages claimed are strength, abrasion resistance, solvent and oil resistance, absence of stickiness or 'sweating', and resistance to boiling soap or detergents. Pigmentation to almost any colour is simple and has no effect on the physical characteristics of the coatings.

Change of Name

Name of the Hydronyl Syndicate Ltd., 14 Gloucester Road, London S.W.7, adopted on foundation in 1914, has been changed to Hydronyl Ltd.

Lightnin Mixers Exhibition

Over 500 chemical engineers and members of the trade and technical press attended a three-day display of fluid mixers which took place in London recently to mark the inauguration of Lightnin Mixers Ltd. This new company, as reported in CHEMICAL AGE, 29 October, p. 710, has been formed by Stockdale Engineering Co., of Poynton, Cheshire, and the Mixing Equipment Company Inc., of Rochester, N.Y., and is now manufacturing the complete range of Lightnin mixers, a selection of which were on show, for the first time in this country, at the exhibition. The visitors, who included representatives of the chemical, petroleum, glass and pharmaceutical industries, were also shown a 30-minute colour film, 'Fluid Mixing' made in the U.S.A.

Cariflex Price Cut

Price of Cariflex SP-103 has been reduced from 28d/lb. ex-store to 27.75d/lb. ex-store by Shell Chemical Co. Ltd. The product is a self-reinforcing masterbatch containing equal parts of high styrene resin and low-Mooney rubber.

Changes of Address

The British Xylonite Group, comprising BX Plastics Ltd., Halex, Cascelloid, Scintillex, Expanded Rubber Co. Ltd., Expanded Plastics Ltd., and Onazote Insulation Co. Ltd., has been moved to 9 Conduit Street, W.1, to new West End offices with showrooms for Cascelloid and Scintillex. These are located at 27 Blandford Street, London W.1. (Welbeck 9211). The main Halex showroom will be situated at Highams Park, 18 minutes from Liverpool Street.

Holden and Brooke Ltd., manufacturers of centrifugal pumps, reciprocating pumps and heat exchange plant, Sirius Works, Manchester 12, have moved their Bristol office to 10 Aberdeen Road, Bristol 8 (Bristol 30927). The Bristol office will continue to serve the West country and South Wales in a sales and consultative capacity under the managership of Mr. F. N. Brooke.

NEW PATENTS

By permission of the Controller, H.M. Stationery Office, the following extracts are reproduced from the 'Official Journal (Patents)', which is available from the Patent Office (Sales Branch), 25 Southampton Buildings, Chancery Lane, London W.C.2, price 3s 6d including postage; annual subscription £8 2s.

Specifications filed in connection with the acceptances in the following list will be open to public inspection on the dates shown. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period.

ACCEPTANCES

Open to public inspection 29 December

Process for the polymerisation of formaldehyde. Farbenfabriken Bayer AG. **857 321**

Production of boron. Union Carbide Corporation. **857 069**

Preparation of aminoboranes. United States Borax & Chemical Corporation. **857 176**

Recovery of hydrocarbon diluent from process off-gas containing same. Phillips Petroleum Co. **857 259**

Manufacture of nitrogen-containing polymers. Shell Internationale Research Maatschappij N.V. **857 180**

Polymerisation catalyst. Esso Research & Engineering Co. **857 181**

Copolymerisation process. Hercules Powder Co. **857 183**

Copolymers and their production. Badische Anilin- & Soda-Fabrik AG. **857 261**

Process for the production of linear polyoxalates. Farbenfabriken Bayer AG. [Divided out of 842 759.] **857 378**

Trifluoromethyl-phenothiazine derivatives. Olin Mathieson Chemical Corporation. [Divided out of 857 546.] **857 547**

Open to public inspection 4 January

Manufacture of combustible gas. Humphreys & Glasgow Ltd. [Addition to 698 640.] **858 119**

Simultaneous production of coal gas and electricity. Steinmüller GmbH, L. & C. **857 919**

Fluorocarbon alcohols and esters thereof. Minnesota Mining & Manufacturing Co. **857 906**

Fluorocarbon acylate and methacrylate esters and polymers. Minnesota Mining & Manufacturing Co. **857 689**

Omega cyanothioalkyl esters of acrylic acids and their polymerisation products. Minnesota Mining & Manufacturing Co. **858 055**

Solvent extraction of sulphur. American Sulphur & Refining Co. **858 056**

Vinyl phosphonic acid and derivatives thereof and a process for their manufacture. Farbwerke Hoechst AG Vorm. Meister, Lucius, & Brüning. **858 057**

Manufacture of combustible gas. Humphreys & Glasgow Ltd. **858 012**

Polymeric materials. Du Pont de Nemours & Co., E. I. **857 600**

Diazo-dyestuffs of the pyrazolone series containing metal and process for their manufacture. Farbwerke Hoechst AG Vorm. Meister, Lucius, & Brüning. **857 584**

Method and apparatus for accomplishing exothermic reactions in continuous manner as, but not exclusively, for sulphonation, nitrations and the like. Ballestra, M. **858 058**

Manufacture of solutions of polyamides of high molecular weight. Farbwerke Hoechst AG Vorm. Meister, Lucius, & Brüning. **858 059**

Process for the preparation of chlorinated and sulphochlorinated polyolefins. Farbwerke Hoechst AG Vorm. Meister, Lucius, & Brüning [Addition to 834 824.] **857 698**

Method of making hydrogen and uses thereof. Esso Research & Engineering Co. **857 587**

Synthetic rubber compositions. Columbia-Southern Chemical Corp. **858 125**

Process for producing acyloxysilicon compounds. Union Carbide Corp. **858 128**

Cold-hardenable organosilicon coating compositions. Wacker-Chemie GmbH. **858 065**

Manufacture of 2,2,3,3-tetrachloro-1,4-butanediol. General Aniline & Film Corp. **858 129**

Stabilised olefin polymer compositions and method of preparation thereof. Goodrich Co., B. F. **858 130**

Linear high molecular weight unsaturated copolymers and process for preparing them. Montecatini. **858 067**

Manufacture of colour pigments in finally divided form. Ciba Ltd. **858 068**

Production of chlorosulphonated ethylene polymers. Phillips Petroleum Co. [Addition to 815 088.] **858 131**

Method of preparing phthalein and fluorescein derivatives. Korbl, J. **858 019**

Process for the production of polyvinylbutyral foils. Dynamit-AG Vorm. A. Nobel & Co. **858 020**

Manufacture of metal salts of formo-sulphathiazole. Ciba Ltd. **858 133**

Roasting of arseniferous minerals, such as pyrites. Bolidens Gruvaktiebolag. **857 867**

Manufacture of alumina. Fullers' Earth Union Ltd. **858 026**

Curing agents for liquid acrolein-pentaerythritol polymers. Union Carbide Corp. **858 135**

Phosphate-modified starches. International Minerals & Chemical Corp. **857 868**

Vulcanisation process. Farbenfabriken Bayer AG. **858 136**

Ion-exchange materials and processes. Permutit Co. Ltd. [Cognate application 13 935, May 1, 1958.] **858 137**

Production of di-substituted hydroquinones. Monsanto Chemical Co. **858 028**

Preparation of basic phenothiazine derivatives. Sandoz Ltd. **858 140**

Process for the production of azo dyestuffs of the phthalocyanine series. Farbenfabriken Bayer AG. **858 070**

Pigments. Du Pont de Nemours & Co., E. I. **858 072**

Emulsion type coating compositions. Armour & Co. **857 944**

Polymerisation process. Monsanto Chemicals Ltd. **857 945**

Process for the production of aluminium trialkyls and alkyl aluminium hydrides. Petrochemicals Ltd. **857 680**

Radioalkylation of normal paraffins. Esso Research & Engineering Co. **858 073**

Antiseptics and disinfectants. Reckitt & Sons Ltd., Stothart, S. N. H., and Beecroft, G. C. **858 030**

Process for the production of polymeric materials. Imperial Chemical Industries Ltd. **857 797, 857, 795**

Synthesis of urethanes. Houdry Process Corp. **858 031**

Introduction of zirconium into magnesium. Magnesium Elektron Ltd. **857 709**

Process of preparation of salts of basic antibiotics. Laboratorio Astral Ltd. **857 875**

Pyrolysis of carbonaceous fuels and gasification of the pyrolysis residue. Aspegren, O. E. A. **858 032**

Polyisocyanate compositions. Imperial Chemical Industries Ltd. **857 876**

Tricarbonyl fluoride polymers and their production. Du Pont de Nemours & Co., E. I. **857 649**

Substituted anilides. Smith, A. E. W. **857 653**

Dyes, photographic developer compounds and compositions. International Polaroid Corp. **857 879**

16-Substituted-6-methylsteriod compounds. British Drug Houses Ltd. **858 033**

Production of expanded polyamides. Badische Anilin- & Soda-Fabrik AG. **858 105**

Polyolefin compositions. Du Pont de Nemours & Co., E. I. **857 881**

Method for end point determination in the production of thixotropic polyamide-modified vehicles. Washburn Co., T. F. **858 034**

Polyamides. Union Carbide Corp. **857 657**

Compounds containing boron and silicon. American Cyanamid Co. **857 882**

Solid detergent compositions. Soc. Belge de l'Azote et des Produits Chimiques du Marly, and Soc. Carbochimique S.A. **858 075**

Preparation of metal chlorides. Columbia-Southern Chemical Corp. **857 884**

Production of tungsten powder. General Electric Co. Ltd. [Addition to 848 462.] **857 969**

Methyl methacrylate polymers. Du Pont de Nemours & Co., E. I. **857 956**

Fluid-fractionation by electrodialysis. Kollsman, P. **858 076**

Method of removing and recovering carbon dioxide from gaseous mixtures. Vetrocoke S.p.A. **857 960**

Production of hydrogen peroxide. Food Machinery & Chemical Corp. **858 035**

Polymerisation. Monsanto Chemicals Ltd. **857 887**

Apparatus for the gasification of hydrocarbons, in particular of heavy mineral oils. Klöckner-Humboldt-Deutz AG. **857 888**

Polymerisation processes. Monsanto Chemicals Ltd. **858 077**

Pyridazines. Lepetit S.p.A. **858 036**

Cyclopentadiene derivatives. Imperial Chemical Industries Ltd. **858 078**

Photopolymerisation of monomers containing vinyl groups by means of silver compounds as catalysts. General Aniline & Film Corp. **858 037**

Polymethylene bis-azetidines. Lepetit S.p.A. **858 038**

Rubber antiozonants. Monsanto Chemicals Ltd. [Divided out of and addition to 852 932.] **857 628**

Combination of hydrogen and oxygen. Engelhard Hanovia Inc. **858 079**

Flame-retardant coating compositions. Pearl Varnish Co. Ltd. **858 039**

Process for the preparation of high molecular weight epoxy-containing acetone-soluble products. Bataafse Petroleum Maatschappij N.V. **858 080**

Process for the preparation of condensation products. Bataafse Petroleum Maatschappij N.V. **858, 040, 857 894**

DIARY DATES

MONDAY 28 NOVEMBER

C.S.—Cambridge: Univ. Chemical Lab., Lensfield Rd., 5 p.m. 'Kinetics of dissociation of a diatomic gas', by Dr. H. Pritchard.

C.S.—Manchester: Room F1, Coll. of Science & Tech., 6.30 p.m. 'Some adventures in heterocyclic chemistry', by Dr. A. R. Kabritzky.

R.I.C.—Dartford: N.W. Kent Coll. of Tech., Miskin Rd., 7 p.m. 'Chemical aids to crop protection', by G. L. Baldit.

TUESDAY 29 NOVEMBER

C.S.—Nottingham: Chemistry Dept., Univ., 5 p.m. 'Catalytic deuteration of some cyclic olefins on metal films', by Prof. C. Kemball.

WEDNESDAY 30 NOVEMBER

Brit. Plastics Fed.—London: Cafe Royal. 'Second International Reinforced Plastics Conference', until December 2.

I.Chem.E.—Birmingham: Main lecture theatre, Chem. Eng. Dept., Univ., 7 p.m. 'Patenting of chemical inventions', by J. Hewitt.

R.I.C.—London: Coll. of Tech., Battersea Park Rd., S.W.11, 6.30 p.m. 'Nitration & nitrosation, a contrast', by Prof. Sir C. K. Ingold.

Soc. Instrument Tech.—Cardiff: Welsh Coll. of Advanced Tech., 6.45 p.m. 'Application & selection of automatic control valves', by P. Stone.

THURSDAY 1 DECEMBER

C.S.—Aberystwyth: Edward Davies Chem. Labs., 5.15 p.m. 'Burgundy 60', by Prof. F. Mackenzie.

C.S.—Newcastle upon Tyne: Chem. Dept., King's Coll., 5.30 p.m. 'Aspects of phenol biogenesis', by Prof. C. H. Hassall.

I.Chem.E.—Battersea: Coll. of Tech., Battersea Park Rd., S.W.11, 6.45 p.m. 'Contracting & design', by N. L. Dickenson.

I.Chem.E.—Manchester: Room B.16, Coll. of Science & Tech., 7 p.m. 'Reactor design', by K. G. Denbigh.

S.C.I.—Liverpool: Coll. of Tech., 7.30 p.m. 'Fertilisers & food production', by Sir William Ogg.

S.C.I.—London: Empire Restaurant, Olympia, Kensington, W.14, 2 p.m. Meeting on 'Influence of water movement on corrosion'.

S.C.I.—London: 14 Belgrave Sq., S.W.1, 6.15 p.m. Meeting on 'Microbiological breakdown of cellulose'.

S.C.I.—Nottingham: Gas Showrooms, 7.30 p.m. Chairman's Address, by A. J. Harms.

FRIDAY 2 DECEMBER

C.S.—Dublin: Chem. Dept., Trinity Coll. 7.45 p.m. 'Chemicals from petroleum', by Dr. R. Holroyd.

C.S. with R.I.C.—Portsmouth: Coll. of Tech., 7 p.m. 'Non-aqueous titrations', by G. F. Lewis.

S.A.C., C.S., S.C.I. & R.I.C.—Glasgow: Royal Coll. Science & Tech., George St., C.I., 7.15 p.m. 'Ramsay chemistry and the electrical industry', by R. C. Chirnside.

S.C.I.—London: 14 Belgrave Sq., S.W.1, 6.30 p.m. 'Pharmacy—art or science?'

S.C.I.—Manchester: Robinson Lecture Theatre, Univ., 6.30 p.m. 'Chemistry of aluminium alkoxides', by Dr. B. K. Davison.

SATURDAY 3 DECEMBER

S.A.C.—Liverpool: City Labs., Mount Pleasant, 2.15 p.m. 'Experiences in estimation of some elements in foodstuffs', by H. Pritchard.

BRITISH CHEMICAL PRICES

GENERAL CHEMICALS

Acetic Acid. 10-ton quantities, 80% tech. in bulk, £77 per ton; in casks, £90 per ton; 80% pure in bulk, £83; in casks, £94; glacial, 98/100% in bulk, £93; in drums, £100.

Acetic Anhydride. Ton lots d/d, £128.

Alum. Ground, f.o.r., about £25.
MANCHESTER: Ground, £25.

Aluminium Sulphate. Ex-works, d/d, £15 10s to £18.
MANCHESTER: £16 to £18.

Ammonia, Anhydrous. Per lb., 1s 9d-2s 3d.

Ammonium Chloride. Per ton lot, in non-ret. pack, £33 2s 6d.

Ammonium Nitrate. D/d, 4-ton lots, £37 10s.

Ammonium Persulphate. Per cwt., in 1-cwt. lots, d/d, £6 13s 6d; per ton, in min. 1-ton lots, d/d, £123 10s.

Ammonium Phosphate. MAP., £106 per ton; DAP, £100 10s., per ton, d/d.

Antimony Sulphide. Per lb., d/d UK in min. 1-ton lots; crimson, 5s 6d d/d to 6s; golden, 3s 9d d/d per lb. to 5s 2d d/d.

Arsenic. Ex-store, £45 to £50.

Barium Carbonate. Precip., d/d, 4-ton lots or more, bag packing, £41 per ton.

Barium Chloride. 2-ton lots, £45.

Barium Sulphate [Dry Blanc Fixe]. Precip. 2-ton lots, d/d, £39.

Bleaching Powder. Ret. casks, c.p. station, in 4-ton lots. £30 7s 6d.

Borax. Ton lots, in hessian bags, c.p. Tech. anhydrous, £59 10s; gran., £47; crystal, £50 10s; powder, £51 10s; extra fine powder, £52 10s; BP, gran., £56; crystal, £59 10s; powder, £60 10s; extra fine powder, £61 10s. In 6-ply paper bags, per ton £58 10s.

Boric Acid. Ton lots, in hessian sacks, c.p. Comm., gran., £78; crystal, £87; powder, £84 10s; extra fine powder, £86 10s; BP gran., £91; crystal, £99; powder, £96 10s; extra fine powder, £98 10s. Most grades in 6-ply paper bags, £1 less.

Calcium Chloride. Ton lots, in non-ret. pack; solid and flake, about £15.

Chlorine, Liquid. In ret. 16-17 cwt. drums d/d in 3-drum lots, £41.

Chromic Acid. Less 2½%, d/d UK, in 1-ton lots, per lb., 2s 2½d.

Chromium Sulphate, Basic. Crystals, d/d, per lb., 8½d; per ton, £79 6s 8d.

Citric Acid—Granular. In kegs, 1-4 cwt. lots, per cwt., £11; 5-19 cwt. lots, per cwt., £10 16s; 1-ton lots, per cwt., £10 15s; packed in paper bags, 1-4 cwt. lots, per cwt., £10 12s; 5-19 cwt. lots, per cwt., £10 8s; 1-ton lots, per cwt., £10 7s.

Cobalt Oxide. Black, per lb., d/d, bulk quantities, 13s 2d.

Copper Carbonate. Per lb., 3s 6d.

Copper Sulphate. £76 10s per ton less 2% f.o.b. Liverpool.

Cream of Tartar. 100%, per cwt., about £11 12s.

Formaldehyde. In casks, d/d, £40.

Formic Acid. 85%, in 4-ton lots, c.p., £91.

Glycerine. Chem. pure, double distilled 1.2627 s.g., per cwt., in 5-cwt. drums for annual purchases of over 5-ton lots and under 25 tons, £12 1s 6d. Refined technical grade industrial, 5s per cwt. less than chem. pure.

Hydrochloric Acid. Spot, per carboy, d/d (according to purity, strength and locality), about 12s.

Hydrofluoric Acid. 60%, per lb., about 1s 2d.

Hydrogen Peroxide. Carboys extra and ret. 27.5% wt., £115; 35% wt., d/d, £138.

These prices are checked with the manufacturers, but in many cases there are variations according to quality, quantity, place of delivery, etc. Abbreviations: d/d, delivered; c.p., carriage paid; ret., returnable; non-ret. pack., non-returnable packaging; tech., technical; comm., commercial; gran., granular.

All prices per ton unless otherwise stated

Iodine. Resublimed BP, under 1 cwt., per lb., 11s 6d; for 1-cwt. lots, per lb., 11s 3d.

Iodoform. Under 1 cwt., per lb., 24s 1d; for 1-cwt. lots, per lb., 23s.; crystals, 3s more.

Lactic Acid. C.P., d/d, 44% by wt., per lb., 13d; 50% by wt., 14½d; 80% by wt., 23d; dark tech., ex-works, 44% by wt., per lb., 9d; 1-ton lots, ex-works, usual container terms.

Lead Acetate. White, about £154.

Lead Nitrate. 1-ton lots, about £135.

Lead, Red. Basic prices: 15-cwt. drum lots, Genuine dry red, £102 5s per ton; orange lead, £114 5s per ton; Ground in oil: red, £123 5s, orange, £135 5s.

Lead, White, Basic prices: in 5-cwt. drums, per ton for 2 ton lots, Dry English £115 5s; Ground in oil, £134 5s.

Lime Acetate. Brown, ton lots, d/d, £40; grey, 80-82%, ton lots, d/d, £45.

Litharge. In 5-cwt. drum lots, £104 5s per ton.

Magnesite. Calcined, in bags, ex-works, about £21.

Magnesium Carbonate. Light, comm., d/d, 2-ton lots, £84 10s under 2 tons, £97.

Magnesium Chloride. Solid (ex-wharf), £17 10s.

Magnesium Oxide. Light, comm., d/d, under 1-ton lots, £245.

Magnesium Sulphate. Crystals, £16.

Mercuric Chloride. Tech. powder, per lb., for 1-ton lots, 20s; 5-cwt. lots, in 28-lb. parcels, 20s 6d; 1-cwt. lots, 20s 9d.

Mercury Sulphide, Red. 5-cwt. lots in 28-lb. parcels, per lb., £1 10s 6d; 1-cwt. lots, £1 11s.

Nickel Sulphate. D/d, buyers UK, nominal, £170.

Nitric Acid. 80° Tw., £35 2s.

Oxalic Acid. Home manufacture, min. 4-ton lots, in 56 lb. paper bags, c.p., about £125-£130.

Phosphoric Acid. TPA 1,700, ton lots, c.p., £103; BP (s.g. 1,750), ½-ton lots, c.p., per lb., 1s 4d.

Potash, Caustic. Solid, 1-ton lots, £95 10s; liquid, £36 15s.

Potassium Carbonate. Calcined, 96/98%, 1-ton lots, ex-store, about £76.

Potassium Chloride. Industrial, 96%, 1-ton lots, about £24.

Potassium Dichromate. Gran., per lb., in 5-cwt. to 1-ton lots, d/d UK, 1s 2½d.

Potassium Iodide. BP, under 1 cwt, per lb., 9s 0d., per lb for 1-cwt lots, 8s 9d.

Potassium Nitrate. 4-ton lots, in non-ret. pack, c.p., £63 10s.

Potassium Permanganate. BP, 1-cwt. lots, per lb., 1s 11¾d; 3-cwt. lots, per lb., 1s 11½d; 5-cwt. lots, per lb., 1s 10¾d; 1-ton lots, per lb., 1s 10½d; 5-ton lots, per lb., 1s 10d. Tech., 1-ton lots in 1-cwt. drums, per cwt., £9 18s; 5-cwt. in 1-cwt. drums, per cwt., £10; 1-cwt. lots, £10 9s.

Salammoniac. Ton lot, in non-ret. pack, £47 10s.

Salicylic Acid. MANCHESTER: Tech., d/d, per lb., 2s 6d, cwt. lots.

Soda Ash. 58% ex-depot or d/d, London station, 1-ton lots, about £16 11s 6d.

Sodium Acetate. Comm. crystals, d/d, £75 8s.

Soda, Caustic. Solid 76/77%; spot, d/d 1-ton lots, £33 16s 6d.

Sodium Bicarbonate. Ton lot, in non-ret. pack, £12 10s.

Sodium Bisulphite. Powder, 60/62%, d/d 2-ton lots for home trade, £46 2s 6d.

Sodium Carbonate Monohydrate. Ton lot, in non-ret. pack, c.p., £64.

Sodium Chlorate. 1-cwt. drums, c.p. station, in 4-ton lots, about £76 10s. per ton.

Sodium Cyanide. 96/98%, ton lot in 1-cwt. drums, £126.

Sodium Dichromate. Gran. Crystals per lb., 1s. Net d/d UK, anhydrous, per lb., 1s 1¾d. Net del. d/d UK, 5-cwt. to 1-ton lots.

Sodium Fluoride. D/d, 1-ton lots and over, per cwt., £5; 1-cwt. lots, per cwt., £5 10s.

Sodium Hyposulphite. Pea crystals, £38; comm., 1-ton lots, c.p., £34 15s.

Sodium Iodide. BP, under 56 lb. per lb., 11s 3d; 56 lb. and over, 11s 0d.

Sodium Metaphosphate [Calgon]. Flaked, paper sacks, £136.

Sodium Metasilicate. (Spot prices) D/d UK in 1-ton lots, 1-cwt. free paper bags, £29.

Sodium Nitrate. Chilean refined gran. over 98%, 6-ton lots, d/d c.p., per ton, £29.

Sodium Nitrite. 4-ton lots, £32.

Sodium Perborate. (10% available oxygen) in 1-cwt. free kegs, 1-ton lots, £129 10s; in 1-cwt. lots, £139 5s.

Sodium Percarbonate. 12½% available oxygen, in 1-cwt. kegs, £170 15s.

Sodium Phosphate. D/d, ton lots: di-sodium, crystalline, £40 10s, anhydrous, £89; tri-sodium, crystalline, £39 10s, anhydrous, £87.

Sodium Silicate. (Spot prices) 75-84° Tw. Lancs and Ches., 6-ton lots, d/d station in loaned drums, £12 10s; Dorset, Somerset and Devon, per ton extra, £3 5s; Scotland and S. Wales, extra, £2 17s 6d. Elsewhere in England, not Cornwall, extra, £1.

Sodium Sulphate [Desiccated Glauber's Salt]. D/d in bags, about £19.

Sodium Sulphate [Glauber's Salt]. D/d, up to £14.

Sodium Sulphate [Salt Cake]. Unground, d/d station in bulk, £10.
MANCHESTER: d/d station, £10 10s.

Sodium Sulphide. Solid, 60/62%, spot, d/d, in drums in 1-ton lots, £36 2s 6d; broken, d/d, in drums in 1-ton lots, £37 2s 6d.

Sodium Sulphite. Anhydrous, £71 10s; comm., d/d station in bags, £27-£28 10s.

Sulphur. 4 tons or more, ground, according to fineness, £20-£22.

Sulphuric Acid. Net, naked at works, 168° Tw. according to quality, £9 15s.—£11 7s 6d per ton; 140° Tw., arsenic free, £8 2s 6d; 140° Tw., arsenious, £7 17s 6d.

Tartaric Acid—Powder and Granular. Per cwt.: 10 cwt. or more, in kegs, 300s; in bags, 292s per cwt.

Titanium Oxide. Standard grade comm., rutile structure, £178; standard grade comm., anatase structure, £163.

Zinc Oxide. Per ton: white seal, £105. green seal, £103; red seal, £100

SOLVENTS AND PLASTICISERS

Acetone. All d/d. In 5-gal. drums, £124; in 10-gal. drums, £114; in 40-45 gal. drums, under 1 ton, £89; 1-5 tons, £84; 5-10 tons, £82; 10 tons and up, £80; in 500-gal. tank wagons, £79. In bulk minimum 2,500 gal. £75 per ton.

Butyl Acetate BSS. 10-ton lots, £165.

***n*-Butyl Alcohol BSS.** 10 tons, in drums, d/d, £137 10s.

***sec*-Butyl Alcohol.** All d/d. In 5-gal. drums, £168; in 10-gal. drums, £158; in 40-45 gal. drums, under 1 ton, £133; 1-5 tons £130; 5-10 tons, £129; 10 tons and up, £128; in 400-gal. tank wagons, £125.

***tert*-Butyl Alcohol.** 5-gal. drums, £195 10s; 40/45-gal. drums: 1 ton, £175 10s; 1-5 tons, £174 10s; 5-10 tons, £173 10s; 10 tons and up, £172 10s.

Diacetone Alcohol. Small lots: 5-gal. drums, £185; 10-gal. drums, £175. 40/45-gal. drums: under 1 ton, £148; 1-5 tons, £147; 5-10 tons, £146; 10 tons and over, £145, in 400-gal. tank wagons, £142.

Dibutyl Phthalate. In drums, 10 tons, d/d per ton, £216; 45-gal. 1-4 drums, £222.

Diethyl Phthalate. In drums, 10 tons, per ton, £201; 45-gal. 1-4 drums, £207.

Dimethyl Phthalate. In drums, 10 tons, per ton, d/d, £194; 45-gal. 1-4 drums, £200.

Dioctyl Phthalate. In drums, 10 tons, d/d, per ton, £287; 45-gal. 1-4 drums, £293.

Ether BSS. 1-ton lots, drums extra, per lb., 1s 11d.

Ethyl Acetate. 10-ton lots, d/d, £137.

Ethyl Alcohol Fermentation grade (PBF 66 o.p.). Over 300,000 p. gal., 3s 10½d; d/d in tankers, 2,500- 10,000 p. gal. per p. gal., 4s 0½d. D/d in 40/45-gal. drums, p.p.g. extra, 2d.
Absolute alcohol (74.5 o.p.), p.p.g. extra, 2d.

Methanol. Pure synthetic, d/d, £40.

Methylated Spirit. Industrial 66° o.p.: 500-gal. and up, d/d in tankers, per gal., 5s 7½d; 100-499 gal. in drums, d/d per gal., 6s 0½d-6s 2½d. Pyridinised 66° o.p.: 500 gal. and up, in tankers, d/d, per gal., 5s 11d; 100-499 gal. in drums, d/d, per gal., 6s 4d-6s 6d.

Methyl Ethyl Ketone. All d/d. in 40/45-gal. drums, under 1 ton, £143 10s; 1-5 tons, £138 10s; 5-10 tons, £136 10s; 10 tons and up, £143; in 400-gal. tank wagons, £134 10s.

Methyl *iso*Butyl Carbinol. All d/d. In 5-gal. drums, £203; in 10-gal. drums, £193; 40-45 gal. drums, less than 1 ton, £168; 1-9 tons, £165; 10 tons and over, £163; in 400-gal. tank wagons, £160.

Methyl *iso*Butyl Ketone. All d/d. In 5-gal. drums, £209; in 10-gal. drums, £199; in 40/45-gal. drums, under 1 ton, £174; 1-5 tons, £171; 5-10 tons, £170; 10 tons and up, £169; in 400-gal. tank wagons, £166.

***iso*Propyl Acetate.** 10 tons, d/d, 45-gal. drums £132.

***iso*Propyl Alcohol.** Small lots: 5-gal. drums, £118; 10-gal. drums, £108; 40/45-gal. drums: less than 1 ton, £83; 1-9 tons, £81; 10-50 tons, £80 10s; 50 tons and up, £80.

RUBBER CHEMICALS

Carbon Disulphide. According to quality, £61-£67.

Carbon Black. GPF: Ex-store, Swansea. Min. 3-ton lots, one delivery, 6¾d per lb.; min. 1-ton lots and up to 3-tons, one delivery, 7d. per lb.; ex-store, Manchester, London and Glasgow, 7¾d per lb. HAF: ex-store, Swansea; Min. 3-ton lots, one delivery, 7¾d per lb.; min. 1-ton lots and up to 3-tons, one delivery, 8d per lb. Ex-store Manchester, London and Glasgow, 8¾d per lb. ISAF: Min. 3-ton lots in one delivery, 9¾d per lb., min. 1-ton lots and up to 3-tons in one delivery, 10d per lb. Ex-store Swansea, Ex-store Manchester, London and Glasgow, 10¾d per lb.

Carbon Tetrachloride. Ton lots, £83 15s.

India-Rubber Substitutes. White, per lb., 1s 4¼d to 1s 7d; dark, d/d, per lb., 1s 0¼d to 1s 4d.

Lithopone. 30%, about £57 10s for 5-ton lots.

Mineral Black. £7 10s-£10.

Sulphur Chloride. British, about £50.

Vegetable Lamp Black. 2-ton lots, £64 8s.

Vermilion. Pale or deep, 7-lb. lots, per lb., 15s 6d.

COAL TAR PRODUCTS

Benzole. Per gal., min. 200 gal., d/d in bulk, 90's, 5s 3d; pure, 5s 7d.

Carbolic Acid. Crystals, min. price, d/d bulk, per lb., 1s 4¼d; 40/50-gal. ret. drums extra, per lb., ¼d.

Creosote. Home trade, per gal., according to quality, f.o.r. maker's works, 1s-1s 9d. MANCHESTER: Per gal., 1s 3d-1s 8d.

Cresylic Acid. Pale 99/100%, per gal., 7s. D/d UK in bulk: Pale ADF, per imperial gallon f.o.b. UK, 8s; per US gallon, c.i.f. NY, 103.50 cents freight equalised.

Naphtha. Solvent, 90/160°, per gal., 5s 3d. heavy, 90/190°, for bulk 1,000-gal. lots, d/d, per gal., 4s 1d. Drums extra; higher prices for smaller lots.

Naphthalene. Crude, 4-ton lots, in buyers' bags, nominal, according to m.p.: £22-£30; hot pressed, bulk, ex-works, £40; refined crystals, d/d min. 4-ton lots, £65-£68.

Pitch. Medium, soft, home trade, f.o.r. suppliers' works, £10 10s; export trade, f.o.b. suppliers' port, about £12.

Pyridine. 90/160, per gal., 16s 6d about.

Toluol. Pure, per gal., 15s 6d; 90's, d/d, 2,000 gal. in bulk, per gal., 5s 0d. MANCHESTER: Pure, naked, per gal., 5s 6d.

Xylole. According to grade, in 1,000-gal. lots, d/d London area in bulk, per gal., 5s 7½d-5s 8½d.

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(Prices Normal)

***m*-Cresol** 98/100%. 10 cwt. lots d/d, per lb., 4s 9d.

***o*-Cresol** 30/31°C. D/d, per lb., 1s.

***p*-Cresol** 34/35°C. 10 cwt. lots d/d, per lb., 5s.

Dichloraniline. Per lb., 4s 6d.

Dinitrobenzene. 88/99°C., per lb., 2s 1d.

Dinitrotoluene. Drums extra. SP 15°C., per lb., 2s 1½d; SP 26°C., per lb., 1s 5d; SP 33°C., per lb., 1s 2½d; SP 66/68°C., per lb., 2s 1d.

***p*-Nitraniline.** Per lb., 5s 1d.

Nitrobenzene. Spot, 90 gal. drums (drums extra), 1-ton lots, d/d, per lb., 10d.

Nitronaphthalene. Per lb., 2s 5½d.

***o*-Toluidine.** 8-10 cwt. drums (drums extra), per lb., 1s 11d.

***p*-Toluidine.** In casks, per lb., 6s 1d.

Dimethylaniline. Drums extra, c.p., per lb., 3s 2d.

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The Permutit Co. Ltd., the U.K. water treatment equipment company, has announced that the new company, Staperm, is to be the channel for the distribution of Ubatol brand polymer emulsions.

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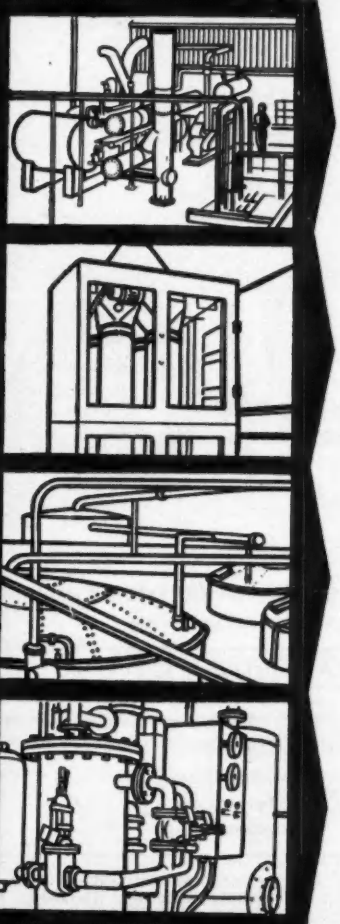

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Continued from page 918

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DEPARTMENT OF CHEMISTRY

Applications are invited for the following appointments:—

(a) Reader in Analytical and Inorganic Chemistry. Salary scale: £1,800×50—£2,100 per annum, plus London Allowance of £38 or £51 according to age.

(b) Lecturer or Assistant Lecturer in Inorganic Chemistry. Salary scales: Lecturer: £1,370×35—£1,550; Assistant Lecturer: £700×£27.10—£1,150; plus additional for training (£30 to £120); graduate status (£90); good Honours Degree (£75); London allowance of £38 or £51 according to age.

Further particulars may be obtained from the Clerk to the Governors, by whom applications should be received not later than 30th November, 1960. (1724)

COURTAULDS

MARKET RESEARCH ASSISTANT

CHEMICAL SALES

BRITISH CELANESE LIMITED

requires a

MARKET RESEARCH ASSISTANT

for its

CHEMICAL SALES DEPARTMENT in Coventry.

Applications are invited from men or women up to 30 years of age, with a knowledge of chemistry up to Degree standard, initiative and preferably some experience of the Organic Chemical or Plastics Industries.

The successful candidate will be required to conduct literature and market surveys in connection with the Company's developing interest in the fields of Organic Chemicals and Plastics. This is an interesting appointment which offers scope for original work and opportunity in an expanding field.

Candidates should write for a detailed form of application to the Director of Personnel, Courtaulds Limited, 16 St. Martins-le-Grand, London, E.C.1, quoting reference number UU/M.15/15.

CHEMIST,

PESTICIDES RESEARCH UNIT,

TANGANYIKA

For research into the chemical aspects of the control of tropical pests and to take charge of the chemical laboratory.
Candidates must have a good Honours Degree in Chemistry with at least two years' post-graduate research experience preferably in insecticide analysis.

Appointment on contract/gratuity terms for one or two tours of service of 30/36 months. Emoluments in range £1,194-£2,241. Entry point dependent upon qualifications and experience. Gratuity at the rate of 16⅔% of total substantive emoluments for the first tour and at 25% for a second and subsequent tours. Generous education allowances. Up to three adult return passages provided once each tour for officer, wife and children. Furnished accommodation, when available, at low rental.

Apply, stating full name and giving brief particulars of qualifications and experience, to Director of Recruitment, Colonial Office, London, S.W.1. Quote BCD.87/8/01/F1.

SITUATIONS VACANT: continued

BRADFORD INSTITUTE OF TECHNOLOGY

Head of Department of Chemical Engineering

Applications are invited for the Headship of the Department of Chemical Engineering which is to be created in the near future.

The Department organises full-time courses for the Diploma in Technology, the B.Sc.(London) degree and qualifications of the Institution of Chemical Engineers. Research is being developed in collaboration with industry. Plans have been approved for a separate new building for Chemical Engineering which will provide excellent facilities for the extension of teaching and experimental work.

Applicants should be well qualified Chemical Engineers with responsible industrial experience, including that of original design. It would be useful to have previous teaching and/or research experience relevant to the development of under-graduate and post-graduate work in collaboration with industry.

The starting salary will accord with the qualifications and experience of the candidate and will be within the range of Grade V or Grade VI of the Burnham Report, i.e. between £2,100–£2,500 per annum.

The appointed Head will be permitted to undertake consultant work.

Further particulars and forms of application may be obtained from the Registrar, Bradford Institute of Technology, Bradford, 7.

HENRY PATTEN,
Clerk to the Governors.

ROLLS-ROYCE LIMITED
SENTINEL WORKS
SHREWSBURY

invite applications for the post of

CHEMIST

The successful applicant will be required to undertake interesting and varied work on metal finishing control and development. Preference will be given to persons experienced in electroplating, paint technology and chemical analysis in the aircraft industry. An H.N.C. or an equivalent qualification in Chemistry is desirable but facilities for further study would be available to a suitable applicant who is not yet fully qualified.

The salary will be commensurate with ability and experience.

Applications, giving full details of experience, age and qualifications, should be sent to:

The Personnel & Training Manager,
ROLLS-ROYCE LIMITED,
Sentinel Works,
Shrewsbury.

CHEMIST

TANGANYIKA

Qualifications: Candidates must have a good Honours Degree in Chemistry, or equivalent professional qualification. Specialisation in Public Analyst work desirable. R.I.C. Diploma in Applied Chemistry in Branch "E" an advantage.

Duties: General analytical work on toxicology, food and drugs, and water; supervision of assistants.

Terms of Appointment: On contract for a tour of 30-36 months with gratuity of 16⅔% of emoluments. Emoluments according to experience in the scale £1,107-£1,863 p.a. Outfit allowance. Generous education allowances. Furnished quarters at rental if available. Free passages. Free medical attention. Generous leave. Income tax at local rates.

Apply to Director of Recruitment, Colonial Office, London, S.W.1. State full name, age, qualifications and experience, quoting BCD.117/8/037.

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